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The Evolution of the Chinese Armaments Industry from 1860 to Present: The Search for Self-sufficiency

A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements for the degree

MASTER OF MILITARY ART AND SCIENCE

by

DONALD A. GREEN, MAJ, USAR
B.A., George Mason College, 1968

Fort Leavenworth, Kansas
1986

Unclassified
SECURITY CLASSIFICATION OF THIS PAGE

AD-B106 052

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION Unclassified	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT Distribution limited to US Govt agencies only; proprietary information, 6 Jun 86. (continued on rovers)
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION U.S. Army Command and General Staff College 6b. OFFICE SYMBOL (If applicable) ATZL-SWD-GD	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (City, State, and ZIP Code) Attn: ATZL-SWD-GD Fort Leavenworth, Kansas 66027-6900	7b. ADDRESS (City, State, and ZIP Code)
8a. NAME OF FUNDING/SPONSORING ORGANIZATION 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code)	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO. / WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification)
The Evolution of the Chinese Armaments Industry from 1860 to Present: The Search for Self-sufficiency

12. PERSONAL AUTHOR(S)
Major Donald A. Green

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
Master's Thesis	FROM 8-1985 TO 6-1986	1986 June 6	105

16. SUPPLEMENTARY NOTATION

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	Chinese Armaments, History of Chinese Military Industry, arsenals

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

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20. DISTRIBUTION/AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION	
☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	Unclassified	
22a. NAME OF RESPONSIBLE INDIVIDUAL	22b. TELEPHONE (Include Area Code)	22c. OFFICE SYMBOL

DD FORM 1473, 84 MAR — 83 APR edition may be used until exhausted. All other editions are obsolete.

SECURITY CLASSIFICATION OF THIS PAGE
Unclassified

19. ABSTRACT (Continued)

the Korean War. In modern times a nation's power to wage war has come to depend increasingly on an efficient mobilization of her economic resources.

3. DISTRIBUTION/AVAILABILITY OF REPORT (Continued)

Other requests for this document must be referred to U.S. Army Comand and General Staff College, Attn: ATZL-SWD-GD, Fort Leavenworth, Kansas 66027-6900

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86-3505

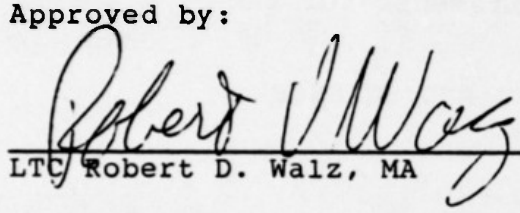
MASTER OF MILITARY ART AND SCIENCE

THESIS APPROVAL PAGE

Name of candidate: MAJ Donald A. Green

Title of Thesis: The Evolution of the Chinese Armaments Industry from 1860 to Present: The Search for Self-sufficiency

Approved by:



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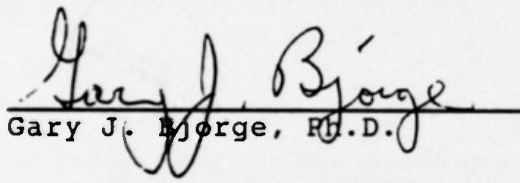

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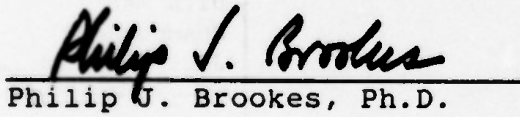

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

THE EVOLUTION OF THE CHINESE ARMAMENTS INDUSTRY FROM 1860 TO PRESENT: The Search for Self-sufficiency, by Major Donald A. Green, USAR, 105 pages.

In attempts to increase their military strength during the last hundred years, Chinese leaders have been faced with a whole series of grave problems. These have included industrial backwardness, poverty, illiteracy, political decentralization, nepotism, a shortage of qualified officers and opposition to change. There is a close relationship between the political, social, and economic structure of a civilization and the armed forces which it develops. An industrial foundation is essential to the maintenance of an effective army, while the size and equipment of the armed services ultimately depend on the ability of the economy to finance.

The purpose of this study is to follow the continuing search for self-sufficiency in economic and military power by Chinese governments from the declining Ch'ing dynasty of the 1860s to the Communists at the end of the Korean War. In modern times a nation's power to wage war has come to depend increasingly on an efficient mobilization of her economic resources.

Table of Contents

Abbreviations

AMS	Academy of Military Sciences of the PLA
CAAC	Civil Air Administration of China
CAS	Chinese Academy of Sciences
CC	Central Committee (of the Chinese Communist Party)
CCP	Chinese Communist Party
CPV	Chinese People's Volunteers (Korean War period)
KMT	Chinese Nationalist Party (Kuomintang)
MAC	Military Affairs Commission (of the CCP Central Committee
MCC	Military Control Committee
MD	Military District (sometimes called PMD)
MMI	Ministry of Machine Industry (numbered one through eight)
MND	Ministry of National Defense/Minister of National Defense
MR	Military Region
NDIC	National Defense Industrial Committee
NDIO	National Defense Industrial Office
NDSTC	National Defense Science and Technology Commission
NORINCO	North Industries Corporation
NPC	National People's Congress
PLA	People's Liberation Army
PLAAF	People's Liberation Army Air Force
PLAN	People's Liberation Army Navy
PLANAF	People's Liberation Army Naval Air Force
PRC	People's Republic of China
SSTC	State Science and Technology Commission

INTRODUCTION

In attempts to increase their military strength during the last hundred years, Chinese leaders have been faced with a whole series of grave problems. These have included industrial backwardness, poverty, illiteracy, political decentralization, nepotism, a shortage of qualified officers and opposition to change. Armies are the products of their society. There is a close relationship between the political, social, and economic structure of a civilization and the armed forces which it develops. An industrial foundation is essential to the maintenance of an effective army, while the size and equipment of the armed services ultimately depend on the ability of the economy to finance them.

During the early 1860s there were few influential Chinese civilian officials whose duties had forced them into contact with the West and who had become convinced of the necessity for adopting modern weapons. It was this small group of civilians, plus enlightened officials with military backgrounds, who began what was known as the "self-strengthening movement" to build up China's defenses. They, like their more numerous obscurantist colleagues, were convinced of the superiority of China's Confucian society, yet they recognized the technical military superiority of the West and wished to employ firearms and steamships to defend the old order. Despite the fact that they were limited in

knowledge of the West, during the decade of the sixties their thoughts concerning defensive measures passed from the desire to purchase arms through several logical steps. They came to appreciate that modern arms must be manufactured in China by Chinese. Then they realized that in order to accomplish this Chinese had to be trained, but training required the establishment of institutions teaching Western sciences and techniques. However, history was to prove that most that most Chinese officials did not comprehend either this basic principle or the steps through which it was developed. [1]

After the Taiping Rebellion, the Chinese armies began to make somewhat greater use of foreign arms or modern weapons manufactured in China. Scattered units were equipped with foreign-style rifles and artillery, yet by 1880 only a small portion of the Chinese were furnished with modern arms. The Franco-Chinese War of 1884-1885 further stimulated rearmament, especially the construction of modern coast artillery forts. Nevertheless, at the time of the Sino-Japanese War the Japanese Staff estimated that only three-fifths of the Chinese troops mobilized against them were armed with some type of rifle, many of the soldiers carrying only a pike, spear, or sword. This lack of standardization, which was to constitute a serious weakness of the Chinese armies throughout the remaining years of the empire, created a logistical nightmare and served as a symbol of the failure to centralize the armed forces. [2]

Important form the standpoint of laying a foundation for the ultimate modernization of the army was the construction of arsenals, which like so many phases of military reform began during the Taiping Rebellion. China could never hope successfully to combat external aggression as long as she was dependent on foreign powers for modern arms. That China's most enlightened leaders were aware of this situation is indicated by the fact that by 1894 there were "arsenals", or at least machine shops, at Shanghai, Nanking, Hanyang, Tientsin, Tsinan, Kirin, Foochow, Canto, and Chegtu. Some of these plants had the finest European machinery, which, if efficiently operated, was capable of producing the latest model breech-loading rifles and guns. Yet, in the same plants where modern arms were or could be made, the Chinese continued to manufacture obsolete gingals and muskets.[3]

The modernization of Chinese national defense capacities has long been a preoccupation of decision makers in China. Both in terms of the specific content of various efforts to enhance Chinese military power and the major consequence deriving from such decisions, modernization encompasses a diverse and complex range of political, economic, and organizational choices. Modernization denotes more than simply selecting among various advanced technologies, although such choices are an integal part of this process. Decisions related to military acquisition also exert a major and direct influence on basic industrial-

ization strategies and the resource allocation process, the manpower and training requirements for China's armed forces, and the defense doctrines espoused by the military leadership.[4]

The purpose of this study is to follow the continuing search for self-sufficiency in economic and military power by Chinese governments from the declining Ch'ing dynasty of the 1860s to the Communists at the end of the Korean War. In modern times a nation's power to wage war has come to depend increasingly on an efficient mobilization of her economic resources.

Few issues have been more pivotal in the history of modern China than those associated with the acquisition and use of military power. For nineteenth-century elites, China's vulnerability to imperialist penetration was viewed principally in terms of the technological proficiency and organizational readiness of Western armed forces, both characteristics sadly lacking in their Chinese counterparts. For twentieth-century leaders, the development of military strength was essential both to China's survival as a political entity and the autonomy of various contenders for power within a fluid and insecure political environment. The twenty-year struggle between Communist and Nationalist forces for the control of China was the logical culmination of these efforts: it was, in purest form, a contest waged through armed strife. The leaders of China's revolution

would be among the last to deny either the effectiveness or necessity of utilizing military means to achieve political ends.[5]

NOTES

1. Ralph L. Powell, The Rise of Chinese Military Power 1895-1912 (Princeton, 1955), p. 25.
2. Powell, p. 33.
3. Powell, p. 35.
4. Richard Baum, ed., China's Four Modernizations: The New Technological Revolution (Boulder, 1980), p. 241.
5. Onkar Marwah and J.D. Pollack, ed., Military Power and Policy in Asian States: China, India, Japan (Boulder, 1980), p. 43.

CHAPTER ONE

Chinese "Self-Strengthening" 1860-1950

More than one hundred years ago, imperial Chinese leaders tried to industrialize their nation, much as China's leaders are attempting today. Self-strengthening projects in industry and the military were implemented to increase China's wealth and power and to protect the country from further colonization by the Western powers of the nineteenth century. There was no strong unified leadership that could push for modernization at this time. This was a major weakness in China's efforts. Some might say that it was the Confucian element that was most resistant to change.

The development of the domestic firearms industry through 1860 was influenced both by the general civilian bias of Chinese civilization, which slowed advances in ordnance technology, and by the periodic military pressures on the Empire, which provided a countervailing stimulus. The year 1860, however, was the threshold of a new stage in the growth of some of the fundamental forces influencing Chinese civilization and a critical juncture when military pressures reached unprecedented intensity. One result was reordering of priorities and values in the minds of certain of China's leaders beginning in that year. Military modernization, particularly the modernization of ordnance production became a central concern.[1]

The 1860s witnessed the establishment of modern

arsenal industries at Shanghai, Tientsin, and Nanking. All grew directly from the urge for self-strengthening of Li Hung-chang, a Confucian pragmatist, who bore the command responsibility for pacification of the Taipings and the Niens and saw close at hand the irrefutable evidence of the superiority of Western ordnance technology. All three arsenals were established for the immediate purpose of supplying ordnance and ammunition to ground forces engaged in rebellion suppression. Li was constantly vigilant lest the infant industries provide opportunities for unscrupulous Westerners to victimize China even further. He sought technological independence for the new ordnance plants which he felt could be best achieved through short-term production-oriented educational reform. Though constantly overwhelmed by urgent demands for military products, Li never lost sight of the transformational effect which machine industry introduced in the arsenals could have on China's socio-economic structure. In a few short years, a handful of innovating Chinese leaders had imported the machine age, but the adjustments and accomodations necessary for machine industry to take root and thrive in China's pre-industrial soil and just begun.[2]

By 1875 the arsenals at Shanghai, Tientsin, and Nanking were producing at full capacity. In less than a decade ordnance production had been transformed by the introduction of steam powered machinery and by modern

industrial methods. Rifles and ammunition produced in China were the same models introduced in the West only several years earlier, and steamships were built at Kiangnan. Li's guiding hand was visible in the development of a pattern of complementary production at the arsenals, Kiangnan stressing small arms, Nanking heavy ordnance, and Tientsin powder and ammunition. The exception to this was Kiangnan's steamship program. A pattern of cooperation was also apparent in the distribution of products from the three arsenals, evidence of coordinated strategic planning for the Yangtze Valley and North China under the overall direction of Li.[3]

Perhaps the most important trend in the development of Li's arsenals by 1875 was their role in self-strengthening. Though all three plants had been hastily established primarily to meet the logistic needs of rebellion suppression, the change in production missions in the late 1860s and early 1870s leaves no doubt that defense against foreign threats by then were assuming an equally important role. Nowhere was this more apparent than at Kiangnan, where steamship building consumed the lion's share of the arsenal's resources. Steamships were clearly not a tool primarily for pacification of rebels, nor were the coastal defense guns built at Nanking. Even at Tientsin the rapid expansion and development of powder and ammunition production after 1870 was plainly inspired, at least in part, by the threat of renewed foreign pressure after the

Tientsin Massacre. Though the arsenals were dependent on foreign materials and technicians and in this sense may be called semi-colonial, at the same time there unquestionably was an anti-imperialist (anti-Western) drive reflected in their production.[4]

In the years from 1872 to 1875, in the absence of a strong national consensus on national defense, Li emerged as a champion of a maritime defense policy that included naval development through purchase and domestic production of selected ordnance and ammunition appropriate to China's present capabilities and his own strategic priorities. Commissioner Shen Pao-chen shared Li's views and cooperated with him in fiscal and production planning. The imperial decision to fund the campaign against the Nien bandits in the Northwest limited the financial resources of the two commissioners for the development of munitions production, however. This limitation and the strategic reasons favoring inland arsenals would result, during the next several decades, in the establishment of provincial arsenals designed to meet the munitions needs of various localities which lay beyond the supply capabilities of either the northern or southern commissioner. The future of the industry seemed to be taking shape. Two authorities had been established to control and develop production in major existing plants. A third area in which production would soon develop was the vast interior, which until that time had known little strategic industry. If Li's

views prevailed, and it seemed likely that they might, production emphasis throughout the industry would be on powder, ammunition, and mines, with the possible exception of Kiangnan, which was already equipped for the production of small-bore ordnance (rifles).[5]

In the decade prior to the Sino-French War, production in the arsenals subordinate to the northern and southern commissioners had developed unevenly. In 1885 Kiangnan was the only plant in China producing modern ordnance (matchlocks, muskets and muzzle-loading cannon were still being produced in China at this time); the annual output included a few usable but obsolescent coastal defense guns and several thousand partially defective rifles, but Kiangnan did not produce modern artillery suitable for use by ground forces. This area of production was covered by the Nanking Arsenal, where a variety of nondescript small and medium caliber guns as well as the relatively new Gatling gun and the premodern gingal[6] were turned out. Powder, various types of cartridges, and gun ammunition were successfully produced at the giant powder factory of the Tientsin Arsenal and at the Lung-hua plant at Kiangnan. The Nanking Arsenal, with its newly established powder plant, turned out black powder, percussion caps for muzzle-loading small arms, and various types of gun ammunition.[7]

The ordnance industry of the late nineteenth century was the epitome of the self-strengthening movement, the

vanguard of its achievements, and the victim of its shortcomings. The environment of foreign dependency in which the industry developed forced the arsenals to rely on China's potential enemies for the elements necessary to maintain modernized production. In the final analysis, this condition would have precluded the use of the arsenals to resist pressures from an imperialist power such as Britain had such been forthcoming. But China avoided direct military confrontation with Britain during those years. Moreover, in the conflicts with foreign military forces that did arise, the Sino-French and Sino-Japanese wars, production deficiencies in the arsenals themselves, rather than imperialist manipulations, weakened China logistically. Therefore the tardy and imperfect progress of modernization in the arsenals was an important factor undermining their mission of anti-imperialism. [8]

Guided by realism, practicality, and open-mindedness on the part of its leaders, the ordnance industry not only opened the era of modernized ordnance production, but it also stimulated change in education, in the economy, and, most important, in official attitudes. Still, the problems that plagued the arsenals, many of which stemmed from the traditional socio-economic and intellectual environment, were overwhelming, and what had been accomplished was only a small fraction of what remained to be done. Imperialism made rapid modernization of the ordnance industry a survival

issue for China, but rapid modernization could take place only under the tutelage of the imperialist powers and through reliance on their men, machinery, and material. This dependency, coupled with production shortcomings in the arsenals, robbed the industry of its anti-imperialist potential, and Japan, the newest imperialist power, forced China to resort to arms just when the ordnance industry had taken the first difficult steps on the long road to modernized production. The result was a humiliating defeat for the proud Chinese by an Oriental neighbor who had long been a cultural protege.[9]

China's loss of sovereignity to foreign powers did not cease even after its 1911 revolution. The only period before 1949 when Chinese regained major control over its domestic economy was when the level of foreign intervention decreased during and immediately after World War I, from 1915 to 1920, when foreign attention was focused away from China. China's industrialization developed rapidly then in core areas such as cotton manufacturing. When foreign intervention returned to its pre-1915 level, Chinese industrialization stagnated.[10]

The chief limitations of China's military potential on the eve of World War II were the nation's industrial stagnation and maladministration. It is not improbable, as some critics have pointed out, that military control of the nation's industrial development did more harm than good.[11] The military men, who were anxious to have guns in a hurry,

neglected to build Chinese factories, preferring to import what they needed. They discovered too late that the finest foreign-made weapons were useless to them if they could not be shipped in, and that the newest German-made 88 mm cannon, when out of ammunition, were even less effective than the old Chinese muzzle-loaders firing black powder and assorted metal scraps.

The prewar Nationalist administration actually put a "five-year military production plan" into effect, but it was concerned chiefly with the standardization of the army's many types of small arms. In those days a single Nationalist Chinese division might have five kinds of light machine guns: the French Hotchkiss, the American Browning, the German Solothorn MG-34, and both Czech- and Chinese-made Brnos. The situation was similar for other weapons. Supply problems were increased by the many varieties of ammunition and the fact that some were not interchangeable. Even the drill manual had to provide instructions for many kinds of weapons. The plan finally adopted was to standardize equipment and, by the outbreak of the war, China had readjusted the light arms of nearly all the Central Army units.[12]

When full-scale hostilities with Japan began, the Chinese Nationalist government, realizing the great value of her industrial equipment, made a supreme effort to move inland whatever industrial facilities she could. The

defense of Shanghai was one of the calculated moves in this effort, and the machinery saved in the evacuation was dearly bought. The effectiveness of this plan may be questioned when one balances, in addition to the human lives expended to buy time, the loss of equipment on the Shanghai front with what could be produced by the machinery saved. [13]

China's own wartime munitions effort during the War of Resistance Against Japan was oriented around three important arsenals. In the days before the war, the arsenals at Nanking, Hanyang, Kung-hsien and Taiyuan shouldered the greater part of the production burden, working largely with imported raw materials. The migration of industries to the interior for defense against the Japanese caused these four units to be consolidated into three arsenals well behind the battlelines. Some production even went on in bomb-proof tunnels miles long and hewn out of solid rock. [14]

Light arms, because of China's weakness in heavy industry, were to be the basis of the Nationalist army's firepower. Automatic weapons were heavily relied on, and mortars remedied the shortage of heavier artillery. The Chinese arsenals manufactured some light arms of good quality and by 1937 the supply of light weapons was said to be sufficient to equip practically all of the Chinese infantry divisions. In 1942, the Chinese had 1,000,000 rifles, 6,600 light machine guns, 17,000 heavy machine guns, 1,000 anti-tank guns, 8,200 trench mortars, and about 250 million rounds of small arms ammunition. About 1941 there

were only 800-odd pieces of artillery, a motley assortment from the arsenals of Europe and Japan. [15]

Despite domestic munitions production, China was committed to the necessity of foreign aid. Her reliance upon outside help, originally dictated by the insufficiency of her own industries, gradually rendered those industries even less capable. China not only neglected her home industries but also her trained personnel and her scientific research program. In World War II the United States had approximately 30,000 scientists and engineers conducting research on new weapons and medicine for war. In China there were not even 300 scientists and engineers engaged in this kind of work. China's military men, insufficiently aware of the realities of modern technological warfare, had too often merely applied foreign methods and had always slighted the nation's needs in education, science, and industrial development. [16]

During this period beginning in 1927, there had been an ongoing armed struggle between the Communist Chinese and the Nationalists. In 1935, the Communist Chinese Army set up its headquarters in Yenan, and a city was established in the caves of a great cliff-face. Some 20,000 people lived in these deep caverns, which proved ideal as shelters from bombing raids. An academy of higher learning and a military academy were organized; hospitals, schools and theatres were established. Yenan became a self-contained Soviet, a colony

of moles, reasonably secure from further interference from the Nationalists.

Communist military units had been engaged in various productive activities since the end of the Long March. In the rear base areas, especially, they had provided protection for the harvest and recaptured plundered crops from the Japanese. Army units had also provided labor during peak periods of agricultural activity, such as harvest. These activities continued to be of particular importance in the base areas in the Japanese rear until 1945, and winning popular support. But in 1943 under the two slogans, "Organize for Production" and "Move with Your Own Hands", unit production by all government, party, and army units began in earnest, with many regular army units engaged in production as a primary activity. They worked mainly in agriculture, but also engaged in small-scale commercial and transportation enterprises.[17]

Modernization of the PLA has been controversial among the top leadership for more than twenty years, opponents arguing that if it did not take place hand in hand with political indoctrination, party control of the armed forces could be undermined. Mao's military doctrine known as "People's War' was developed in the 1930s and 1940s to compensate for the inferiority - at least initially - of his forces compared with those of the Nationalists. Mao perceived that China's abundant manpower, vast space, and

rough terrain could be used to military advantage. He freely borrowed from the fourth century B.C. Chinese strategist Sun Tzu, Lenin, and others and incorporated his military doctrine within a formula for protracted psychological, economic, and military struggle. Political and economic grievances were incorporated in order to win the cooperation of the people as a source of military manpower, food, and intelligence. Mao strengthened morale by stressing man's dominance over weapons, and he distributed equipment collected on the battlefield to all units, giving priority to the main forces. Mao was always dubious as to the value of heavy weapons such as tanks. He preferred to rely on human factors rather than material ones to defeat the enemy, as expressed in his slogan, "men over weapons". He also believed that an army of simple conscripts with small arms would be much more loyal to the revolution than highly trained professional soldiers.[18]

During the Kiangsi and Yenan periods, the CCP had captured many rifles and machine guns from the Nationalists. Increasingly, communist armories in Yenan had manufactured light weapons and ammunition. Tactics emphasized deception, surprise, psychological warfare, close combat, and night fighting in order to preserve the guerrilla forces and negate the enemy's advantage in weapons. The ultimate success of these self-reliant methods persuaded Mao that the unlimited energy and ingenuity of the people left little

need to seek help from abroad for more modern weapons. But the final showdown between the CCP and the KMT underlined the need for modern arms. The Japanese surrender precipitated a race between the Nationalists and Communists for control of the mainland. The general situation at the time was one in which the Nationalists secured the cities and main lines of communications, while the Communists controlled the countryside and waged a war of attrition through a combination of guerrilla and conventional warfare.

The Soviet Army in Manchuria then came to Mao's aid. During their blitzkrieg demolition of the Japanese Kwantung Army in August 1945, the Russians had captured vast quantities of Japanese arms. Most of these arms were then transferred, in one way or another, to Chinese communist forces during the winter of 1945-46. Other Japanese equipment was taken by communist forces in north and central China. According to figures later released by the Chinese communists, the Soviet Army provided from Japanese stocks more than 1200 cannon and over 360 tanks. The communists were also given 300,000 modern rifles, 4800 machine guns, and 2300 trucks. In aggregate, arms and equipment from nearly 600,000 Japanese troops were provided during the winter of 1945-46.[19]

Moreover, as the PLA went over to the strategic offensive in 1947, ever-increasing quantities of military equipment were captured from the disintegrating Nationalist

forces. In May 1947 the communists captured 20,000 rifles in Manchuria alone. By mid-1948, when the Nationalist armies numbered more than 2.5 million to 1.5 million deployed by the PLA, the two sides were equal in rifles and artillery.[20]

The trend continued when in September 1948 the PLA captured 50,000 rifles and large ammunition dumps at Tsinan. During the last four months of 1948 the Nationalists lost over 140,000 American supplied rifles to the PLA. Losses of other rifles (primarily Chinese and Japanese manufactured) were several times this figure. By early 1949 the PLA was superior to the Nationalist armies in manpower, equipment and morale. The communist forces had triumphed.[21]

When the PLA became a national armed force in 1949, it was a swollen unwieldy mass of over 5 million men. In 1950 massive demobilization of ill-trained or politically unreliable troops, mostly defectors from Chiang's army, reduced the regular ground forces to about 3 million men. The Chinese claimed the militia had an additional 5.5 million men, and the fledgling air force and navy numbered about 10,000 and 60,000 respectively. [22]

The new Communist Chinese Air Force, in 1945, was theoretically the strongest air arm in northern China. Modern in every way, it was made up of Nakajima Ki.43 Type 1 Hayabusa and Ki.84 Type 4 Hayate fighters of the 48th, 104th, 204th Japanese Army fighter regiments formerly

stationed in Manchukuo; Nakajima Ki.44 Type 2 Shoki and Kawasaki Ki.61 Type 3 Hien fighters stationed in northern China; and more than 100 Misubishi Ki.51 Type 99 ground-attack and Kawasaki Ki.48 Type 99 two-engine light bombers captured in Manchuria. Of more immediate importance to the communists were the many transports and trainers obtained at Mukden and Harbin, the major Manchukoan Japanese Army Air Force bases. Mitsubishi Ki.57 Type 100, Tachikawa Ki.54c Type 1, and Nakajima Ki.34 Type 97 transports flown by Japanese pilots entered into Communist Army service immediately, providing the field armies with the first direct air communication they had ever enjoyed. Tachikawa Ki.55 Type 99 and Manshu Ki.79 Type 2 advanced trainers, as well as Tachikawa Ki.54a Type 1 two-engine advanced trainers, were taken over in droves by the Chinese at Mukden, and by October 1945, they provided the communists with all the equipment they needed for modern flight-training schools set up in Manchuria. Many of these former Japanese trainers remained in PLAAF service for many years, with some of them in service until the early 1960s. [23]

In the last twelve months of fighting, the communists had captured hundreds of Nationalist aircraft, bringing their total number of planes to more than 500. Only about half of them were air-worthy, and by the end of the fighting, the PLA air arm had about 150 serviceable fighters

and between 75 and 100 transports and bombers, most of them flown by ex-Nationalist pilots. In addition, over 1,400 trained Nationalist aircraft technicians were captured at Shanghai, at last giving the rapidly growing communist air arm the ability to service properly its growing inventory of aircraft.[24]

The net result was that when the Chinese Civil War ended, the 20,000-strong guerrilla force which survived the Long March in 1935 had grown to an army of 4 million men. This force was capable of mobile and positional warfare alike, and was the largest army in Asia.

Even before the official proclamation of the People's Republic of China (1 October 1949), the process of consolidating power and converting party and army to a peacetime footing was underway. During that same month, Hsu Hsiang-ch'ien was named to be the first Chief of the General Staff, with Nieh Jung-chen as his deputy. For decades Nieh had been an advocate of professional and technical specialization in both party and army. He was soon to prove his political and logistical skill with the procurement and allocation of Soviet weapons to troops in the Korean staging areas in Manchuria.

The Korean War (1950-53) was a watershed in the development of the PRC and its armed forces. It presented the People's Republic with its first external enemy and an opportunity quickly to unify the torn country against the

"western imperialists." The practice of battlefield acquisition had enabled the Chinese communists to keep forces operating in the field during the Civil War, but it meant that the leadership had little experience in the design of weapons and the logistics of their production when the CCP came to power. Furthermore, the Korean War, coming so soon after the Chinese communists had displaced the Nationalists, denied Peking the luxury of going back to the principles of "people's war" by building a modern army with a coherent, long-range defense posture.

The modernization of the PLA was initiated with the signing of the 1950 Treaty of Friendship, Alliance, and Mutual Assistance between China and the Soviet Union. It was signed in Moscow on February 14, 1950 and provided an economic development loan of $300 million from the Soviet Union. Additional impetus was provided by the PLA's experiences in the Korean War, which it entered in October 1950 under the aegis of the Chinese Peoples Volunteers. In Korea, initial successes aside, the Chinese quickly learned that in the offensive, unsupported massed infantry attacks ("human wave tactics") against vastly superior firepower were not only unavailing but in most cases led to disastrously high losses in personnel and equipment. Furthermore, to avoid the possibility of United Nations forces entering the PRC proper, the Chinese found themselves in a situation in which they were unable to employ the

People's War doctrine of strategic retreat. They were no longer able to trade space for time as they had done in the past in the vast heartland of China. For the first time, they were forced to assume a form of defense previously abhorrent to them - a linear, positional defense. [25]

As early as April 1951, P'eng Te-huai (commander of the CPV) was complaining bitterly to Chou En-lai that his logistical support was grossly inadequate. [26] The PLA had crossed the Yalu with the same hodge-podge of weapons and equipment with which it had ended the Civil War, apparently intending to resupply itself off the enemy, as it always had before. That source of supply dried up after the initial offensive was blunted, however. The logistical burden produced by the diverse types and calibers of ammunition alone would have strained the most modern supply system, but the CPV had to depend on a trickle of supplies, laboriously brought over the mountains at night on the backs of Chinese and Korean porters. The system had to be modernized, and the PLA had to standardize its ordnance.

Each of the six Chinese armies of the CPV comprised three divisions. Each division was made up of some 10,000 men. The divisions were normally composed of three regiments, a pack artillery battalion, engineers, transport (donkey, mule, or horse), medical and communication companies. There were no vehicles, tanks or towed artillery. To overcome the lack of anti-tank weapons, each

platoon was issued with TNT which was packed in 5 pound satchel charges, each of which was sufficient to blow the track off a tank. The lack of heavy equipment allowed divisions to move across country in complete secrecy and gain great advantage from surprise.

Some artillery crossed into Korea but it was scarcely used in the early stages of the fighting. Once, however, the stalemate set in on the 38th parallel in the summer of 1951, the Chinese became far more effective in their use of artillery and heavy mortars.

No uniformity existed among the personal weapons carried by the soldiers. The only standard weapon was the PPSh ('burp gun') of Russian origin. P'eng Te-huai knew he needed help, and he knew where to get it: the General Staff had been pressing the Soviets for massive aid from the outset of the fighting, and Stalin's initial hesitancy had caused considerable Sino-Soviet friction. By late 1951, however, significant Soviet aid began to reach the front, and P'eng was able to somewhat stabilize his supply situation. The PLA was gradually reequipped with Soviet weapons.[27]

The Chinese used all of the Soviet post-World War I and World War II weapons in Korea. They also put some of these weapons into production, using their own year of adoption as their model designations. The Soviet 7.62 PPSh M1941 submachine gun was produced by the Chinese as the Type

50.[28] The Soviet 7.62 TTM 1933 pistol was adopted and put into production as the Type 51. The Soviet M1944 Mosin Nagant carbine was put into production as the Type 53.[29] The Soviet DPM light machine gun was put into production as the Type 53.[30]

In crude terms, tremendous personnel casualties the PLA suffered on Korean battlefields were more than offset by Soviet technical and material aid. Close and apparently entirely friendly relations with the Soviet Union implied that Chu Teh's hope for a "great, historic transition" of the PLA to a fully modernized military establishment would soon be realized. As events were to prove, this expectation was ill founded.[31]

While the PLA was developing a more professional orientation, a capacity - although on a small scale - to manufacture rifles, submachine guns, mortars, automatics, small-arms ammunition, grenades, and explosives had been created. Limited sectors of the Manchurian industrial base looted and destroyed by the Soviets in 1945-46 had, with Russian help, been rehabilitated.

Thus, although the Korean episode may have set back the Party's plans for the rapid development of a heavy-industry base, the war was by no means an unmitigated disaster, at least in the eyes of the leadership.[32]

The necessity for acquiring modern military power has never been the subject of serious challenge among China's

leaders. Beyond a minimal consensus on this objective, however, substantial diversity in opinion and outcome has long been apparent: what to acquire, how much, how quickly, by what means, and for what purposes. In addition, the particularly consequential nature of such decisions for resource allocation, technology acquisition, and basic industrialization remains a singular leadership consideration. Such issues emerged with unexpected suddenness in the Korean War, and they continue to preoccupy Chinese policy makers a quarter century later.

As we have seen, during the period 1860 to 1950, many of the same problems have continued to plague the leadership of China whether Imperialist, Nationalist or Communist. As the Communist Chinese emerged from the Korean War, they were again dependent on a foreign power for weapons and weapons technology. The search for self-sufficiency would begin again.

NOTES

1. Thomas L. Kennedy, The Arms of Kiangnan: Modernization in the Chinese Ordnance Industry, 1860-1895 (Boulder, 1978), p. 18.
2. Kennedy, p. 57.
3. Kennedy, p. 76.
4. Kennedy, p. 77.
5. Kennedy, p. 98.
6. Gingal or jingal was a light, swivel-mounted cannon or a large musket fired from a rest, formerly used in central Asia.
7. Kennedy, p. 119.
8. Kennedy, p. 151.
9. Kennedy, p. 160.
10. Stephen C. Thomas, Foreign Intervention and China's Industrial Development, 1870-1911 (Boulder, 1984), p. 165.
11. F.F. Liu, A Military History of Modern China: 1924-1949 (Princeton, 1956), p. 153.
12. Liu, p. 154.
13. Liu, p. 155.
14. Liu, p. 159.
15. Liu, p. 155.
16. Liu, p. 161.
17. Harlan W. Jencks, From Muskets to Missiles: Politics and Professionalism in the Chinese Army, 1945-1981 (Boulder, 1982), p. 43.
18. Ray Bonds, ed., The Chinese War Machine (New York, 1979), p. 29.
19. Ashley Brown and Sam Elder, ed., War in Peace (New York, 1981), p. 9.
20. Brown and Elder, p. 9.
21. Brown and Elder, p. 9.
22. Frederica M. Bunge and Rinn-Sup Shinn, ed., China: A Country Study (Washington, D.C., 1981), p. 461.
23. Richard M. Bueschel, Communist Chinese Air Power (New York, 1968), p. 14.
24. Bueschel, p. 18.
25. Defense Intelligence Agency, Handbook on the Chinese Armed Forces (July, 1976), p. 1-4.
26. Jencks, p. 47.
27. Jencks, p. 48.
28. The Type 50 is like the Soviet with a major difference in that the Chinese-made weapon has a differently shaped buttstock and is usually found only with a box magazine.
29. The 7.62 Type 53, which is a copy of the Soviet 7.62mm M1944 Mosin Nagant carbine, has appeared with a rifle grenade launcher. The launcher is of the removable type and has a clamp type lock that engages behind the front sight in a manner similar to the US M7 and M8 rifle grenade launchers. When the rifle grenade launcher is attached, the folding bayonet cannot be fixed.

30. Joseph E. Smith and W.H.B. Smith Small Arms of the World, 8th ed., (Harrisburg, 1970), p. 297.
31. Samuel B. Griffith, The Chinese People's Liberation Army (Newy York, 1967), p. 182.
32. Griffith, p. 182.

CHAPTER TWO

SINO-SOVIET RELATIONS, 1950-1960

The ten years following the Korean War saw a "honeymoon" period in Sino-Soviet relations especially after the death of Stalin in 1953. The Soviet Union was the only major power that was willing and able to assist China in her military modernization program. This was not to be without cost to the Chinese and strings attached by the Soviets. The shaky alliance collapsed in 1960 with the Soviets pulling out all of her military and technical advisors. The People's Republic of China (PRC) was again thrown back on her own resources.

The early 1950s were devoted to reconstruction and the start of forced industrialization. The emphasis on heavy, and especially military, industry was based on the lessons from the Korean War and by the influence of Soviet aid and advisors. There was remarkable progress, accompanied by an intensifying search for organizational forms more suited to Chinese society and ideology than the simple copying of Soviet experience.

The Soviet Union and Communist China were both drawn together and divided by ideology, national interest, military alliance, and political collaboration. The military was only one strand in a complex pattern of relationships. On the other hand, military frictions have aggravated the serious rift between the two powers; even

more significantly, the military has been the victim of political and ideological conflicts. [1]

As was shown earlier, during the critical years from 1945 through 1948, Soviet assistance to China was limited. Military assistance consisted in allowing the Chinese Communists to gain strategic footholds and to acquire captured Japanese ordnance in Manchuria; political assistance was initially given to the Nationalist Government by the 1945 Treaty of Friendship, which clearly recognized it as the government of all China; and economic "assistance" was limited to stripping Manchuria of its industrial assets at the expense of both Chinese rivals. The Soviet objective was to win concessions and influence for the USSR from a weak China, and to keep China weak through a nominal Nationalist role in which the Russians had powerful leverage through the Communists. [2]

The Russians, therefore, permitted the Chinese Communist Eighth Route Army to enter Manchuria and allowed them to "seize" capture Japanese military equipment and supplies in raids on lightly "guarded" stocks. There is no evidence of further Soviet military assistance to the Chinese Communists during the four years of the Civil War. The items the Communists seized from the Nationalists, including the U.S. material originally supplied to the Nationalist armies, and not Soviet-supplied weapons,

provided the Chinese forces with the implements for winning the Civil War. [3]

At this point, the entire Communist Chinese military needed drastic reorganization. Once again, the Russians, who had maintained a hands-off policy toward the Civil War, offered their assistance, but now they were virtually given carte blanche. The Russians had sent a military mission to Peking in July, 1949, when they recognized the possibility of a Communist victory on the mainland. The Soviet Air Force was represented by a Colonel Voroshilov sent to China to supervise a pilot training program. Preliminary work was started on a primary flight program, but Voroshilov subsequently reported to Moscow that the training of Chinese pilots would be too costly and time-consuming and that the need did not exist, as the Chinese were assured of victory. Within a few short months, this entire concept changed. On December 16, 1949, Mao Tse-tung went to Moscow as a Communist hero and ultimately signed an agreement for Russian aid at all levels, military and civilian, to bring the PRC up to the status of a world power. By April, 1950, Russian technicians and advisors were swarming into China. One of their prime goals was to discard the haphazard structure of the air arm and create a modern force along Russian lines, including regiments, divisions, and air armies. Russian equipment was rushed into China, and PLAAF fighter units were revitalized. The equipment for the

fighter regiments were standardized, with units flying about 200 Lavochkin LA-9, Lavochkin LA-11, Yakovlev YAK-9P, and North American P-51D fighters. Jets, in the form of a few Mikoyan MiG-9 fighters, were also introduced. The entire structure of the PLAAF was upgraded, and an air-force academy was established at Xian in Shaansi Province. [4]

The Treaty of Friendship, Alliance, and Mutual Assistance between the USSR and the PRC was signed in Moscow on February 14, 1950. An economic development loan of $300 million from the Soviet Union was included in the agreements. Military expenditures represented 48 per cent of the Chinese budget by 1951. The Soviet military-aid program became and remained extensive, but it also was expensive. The Chinese were compelled to purchase all this material, and they incurred heavy debts in the process. From 1950 to 1957, the value of such aid approximated $2 billion, of which perhaps half was covered by Soviet credits. [5]

Because Soviet assistance was essential to China, the Chinese had no choice but to accept Soviet terms. Modernization and mechanization of the Chinese military establishment required production, logistics, and communications systems that would have been impossible to obtain otherwise.

While helping to build Chinese military power, Stalin tried to keep it dependent on the Soviet Union. Weapons were supplied, but assistance in creating

military production was not. The Russians could not directly prevent the Chinese Communists from building their own military industry, but they could and did withhold their assistance while arguing that it was more economical to buy Soviet-produced weapons. And, by saddling the Chinese with outlays as heavy as they could bear, the Russians further held back the Chinese from building an independent military establishment.[6]

Stalin used the occasion of the Korean War to sell more modern weapons to China; he also pressed the Chinese in other ways. In September, 1952, he forced a modification of the 1950 Treaty extending indefinitely the Soviet occupation of Port Arthur on the Yellow Sea by deferring withdrawal until after a Japanese peace treaty was signed.[7]

Before the Korean conflict was resolved, however, and before its full effects on relations between Moscow and Peking became apparent, an event of far greater importance shook the whole Communist world: the death of Stalin in March 1953. He had been the sole architect of and had dominated every aspect of Soviet policy at home and abroad, and he had been primarily responsible for the shape which Sino-Soviet relations had taken. His death inevitably threw every aspect of policy into abeyance. In particular it opened up for the Chinese the possibility of putting their relations with Russia on to a basis more approaching equality.[8]

After Stalin's death, a "honeymoon period" in Sino-

Soviet relations facilitated modernization. China strove to be "modern and Soviet." P'eng Te-huai became the PRC's first Minister of Defense in September 1954. Working closely with Marshal Zhukov, his opposite number in the Soviet Union, P'eng presided over a far-reaching program of modernization. With Russian guidance, the Chinese Communists embarked on a twelve-year plan for the development of science and technology and established a number of Ministries of Machine Building to develop and manage the new military production facilities being created with Russian aid.

Jet aircraft, originally coming under the second Ministry of Machine Building responsible for the production of munitions and weapons, were of prime importance. Russian technicians, engineers, and industrial-management personnel convened in Shenyang at the site of the former Mukden plant of the Manshu Airplane Manufacturing Company, a large aircraft- production facility built in 1938 and operated by Japanese and Manchukuoan interests during World War II. When the Russians invaded Manchukuo early in August, 1945, the Mukden plant employed 4,965 people and produced aircraft engines and airframes for the Japanese Army. Manshu plants were also located at Kungchuling, where 1,462 people were employed to produce training planes, and at Harbin, where a work staff of 3,478 produced aircraft engines. The facilities were modern in every way, and within a matter of

months, the Russians had removed about 95 per cent of the machine tools and equipment from the plants to the Soviet Union for their own use. The looting of the Manshu plants eliminated any possibility of immediate postwar aircraft production at the sites. However, the buildings and adjoining airfields remained intact, and many of the former Manshu employees, skilled in modern aircraft production, remained in the area to provide a labor pool for any reinstatement of production. [9]

The creation of a new aircraft-production facility in Manchuria, reportedly the largest manufacturing plant built under Russian supervision in China in the mid-1950s, was one of the few cases in which the Russians found themselves rebuilding an industrial complex they themselves had destroyed. The National Aircraft Factory of the second Ministry of Machine Building was set up with its main plant at Shenyang under the direction of Russian production experts and a qualified staff of Chinese aircraft engineers who had studied in both America and Russia. Licenses were obtained to produce aircraft of Russian design as part of the first Chinese five-year plan, scheduled for the period between 1953 and 1957. This Soviet assistance was based on aid agreements signed in Moscow in November, 1952 and October, 1954, the latter agreement providing China with the necessary production licenses, engineering drawings, and technical aid for the production of combat aircraft. The

Chinese staff, supervised by Russian management and shop personnel, got the plant back into working order and in 1954 started modest production of the Yakovlev YAK-18 primary trainer. The initial models were assembled in China from Russian components. The aircraft industry developed rapidly and the Chinese were soon producing both the required M-11PR engines under license and the complete aircraft. By the fall of 1956, the Chinese Communists had produced their first combat aircraft, a Shenyang MiG-17 fighter assembled from components and assemblies supplied by the Soviets. At the end of the year, the PLAAF proudly took delivery of its initial Shenyang fighter. The Chinese aircraft power plants had been developed, and production begun, under the supervision of the Institute of Mechanics of the Chinese Academy of Sciences, an establishment set up early in 1956 to study jet propulsion and produce jet engines in

The Ministries of Machine Industry

Ministry	Responsibility
Second	Atomic Energy
Third	Aircraft and Air-to-Air Missiles
Fourth	Electronics
Fifth	Ordnance (Conventional weapons)
Sixth	Shipbuilding
Seventh	Ballistic Missiles
Eighth	Tactical Missiles (except air-to-air)

Communist China as part of the twelve-year plan for self-sufficient technology.[10]

Within three months of Stalin's death, the Russians promised to undertake the design and construction of 91 industrial plants in addition to the 50 which they had undertaken to equip under the 1950 agreements. The promises of May 1953 were written into formal agreements in September of the same year and supplemented by further agreements in October 1954, when another 15 industrial plants were added to the operation.[11]

The agreements of October 1954 were negotiated by a delegation of Soviet leaders which went to Peking for the celebration of the fifth anniversary of the People's Republic. Symbolically, it was important that the review of the Sino-Soviet relations took place in Peking rather than in Moscow. Khrushchev, Bulganin, Mikoyan, and Shvernik headed the delegation, reflecting the combined political, Party, economic, and military interests involved. The agreements were signed on October 11, 1954. One reversed the Stalin diktat of only two years earlier; the USSR agreed to withdraw from Port Arthur by May 31, 1955 and to turn over the Soviet installations there without compensation. A scientific-technical agreement was also signed. The provision of the 1950 Treaty for joint exploitation of uranium resources in Sinkiang was revoked, with full control reverting to China on January 1955. No new military agreements were announced or, apparently, reached.[12]

In 1955, the Russians withdrew from Port Arthur as promised, leaving the aircraft belonging to their units there to extend the impression of generosity. An additional agreement on cooperation in the peaceful applications of atomic energy was reached in 1955. The following year, China joined other Communist states in entering the cooperative "socialist" nonmilitary atomic research center at Dubna near Moscow (where the Russians, incidentally, could siphon off the work of the best East European and Chinese nuclear physicists). Chinese specialists at Dubna were finally all withdrawn in 1965.[13]

The year 1958 was the high-water mark for the PRC in the air. The strength of the PLAAF was at an all-time peak, and domestic aircraft production was getting into full swing. Production of the Russian Mil MI-4 helicopter was undertaken by the Shenyang complex in 1958, and the first civil Chinese version, the Whirlwind, was announced in 1959. The Chinese MI-4 entered PLAAF military service, joining Russian-built prototypes, and a substantial number of the civil models were built for the Special Flight Group. The PLAAF helicopters often aided in civil work after national disasters, such as earthquakes or droughts.[14]

The Communist Chinese concept of technical education was to combine theory with practice, leading to the establishment of aeronautical engineering schools on the same sites as the aircraft-producing factories. The

engineering students studied in class with texts and teaching aids, and then actually worked in the assembly shops. This dual knowledge, of basic design and of production requirements, was to pay great dividends in later years after the Russians pulled out of China and left the Chinese Communist aircraft industry on its own. [15]

Another indication of China's desire to catch up with technology could also be discerned in the shipbuilding industry. By 1959, PRC naval builders were producing four to six Shanghai-class gunboats a year and had begun experimenting with the Swatow-class patrol boat, a more capable system using P-6 motor torpedo boat hulls and carrying 37mm guns fore and aft. With Soviet assistance, the Chinese had assembled four Riga-class destroyer escorts at the Hutung Shipyard, Shanghai, in 1955-56. The Soviets also helped the Chinese assemble W-class submarines, Kronstadt-type patrol craft, T 43-class minesweepers and motor torpedo boats. [16]

The shipbuilding industry also began to replace older ex-Nationalist designers and builders with younger technicians. In 1959, for example, two conferences were convened in the shipbuilding industry for the purpose of reviewing new designs. All of the presentations, which included design figures, estimates, and other data, were given by young men in their twenties, while the senior engineers and advisors sat on the sidelines and observed. [17]

The flow of Soviet modern weapons diminished during the late 1950s, not because the Russians decided to choke it off but because the short-term air force and naval strength levels had been reached. In retrospect, it seems clear that the Chinese demand that a modern defense industry be built up in China was gaining acceptance. Progress had been made by the Chinese in conventional basic land armaments such as small arms and artillery; but now, with Soviet help. a beginning was also made in the partial construction and assembly of jet fighters, complete construction of light piston aircraft, and construction of tanks, submarines, and small patrol craft. As already shown, by September 1956, the first jet fighters of Chinese "manufacture" were flown - with some fanfare. [18]

The Chinese Communist Army, by the late 1950s, had been substantially modernized into a force of reasonably well-equipped light infantry divisions. Soviet training activities had been largely completed and phased out in the mid- and late-1950s, and the military mission in Peking turned to problems of production facilities in more modern armaments and to coordination of military activities. [19]

The years 1958 and 1959 were critical in the history of Sino-Soviet relations, packed with events, starting with an apparent rapprochement between Moscow and Peking and ending with relations so strained that a conciliation between Mao and Khrushchev had become practically

impossible. The events of those two years determined the whole future course of the Sino-Soviet dispute with its impact on the defense industry.[20]

From the beginning of 1958, Khrushchev's China policy appears to have had two main elements: to increase the scale of Soviet economic, and possibly military, aid to China, thus reassuring the Chinese of Russian friendship and support and increasing Russian penetration of China's economy; and to oust Mao Tse-tung and the leftist elements from the Chinese leadership. Khrushchev made a desperate and expensive effort in those years to bring Communist China under Moscow's control. He failed.[21]

While Mao certainly objected to certain manifestations of Soviet influence, he was not opposed to modernization per se. He supported the development of modern industry, and reportedly called for nuclear research as early as 1955.[22] He recognized that nuclear weapons would strengthen his hand in world politics. Mao's main criticism was directed against the "mechanical application of foreign experience."

On October 15, 1957, an important agreement with respect to "new technology for national defense" was concluded between the USSR and the PRC. This agreement was secret, and was disclosed by the Chinese only in 1963, in protest over alleged Soviet perfidy in unilaterally "tearing it up" in June, 1959.[23] The Chinese disclosure of the agreement did not specify its content, but stated that, in

June, 1959, the Russians "tore up the agreement, and refused to supply a sample atomic bomb and technical data concerning its manufacture."[24] They did not state the supply of a sample weapons and technical data was promised in the agreement, which is extremely unlikely, but they imply that a liberal interpretation of the spirit of the agreement should have extended to supply detailed data on nuclear weapons. It is clear that the Soviet leaders in the latter half of the 1950s were torn between wishing to improve relations with China and seeking to prevent Chinese acquisition of nuclear and other advanced weapons. As a consequence of these opposing motivations, their policies were not fully consistent. The Russians refused to assist in nuclear-weapons technology, but they did assist the Chinese in building a major gaseous diffusion facility for production of fissionable materials useful for weapons as well as for other purposes. Thus, they assisted the Chinese Communist nuclear program until 1960, but reluctantly and incompletely.

During the period from late 1957 until mid-1960, the Russians continued to aid the Chinese in developing their own missiles and aircraft, and probably in working toward construction of their own fissionable materials production. But it is quite clear that, at some point between November 1957 and May 1958, the Russians disclosed the "strings" that they placed on any disposition of nuclear warheads: "In

1958 the leadership of the CPSU put forward unreasonable demands designed to bring China under Soviet military control. These unreasonable demands were rightly and firmly rejected by the Chinese Government."[25]

September, 1958 saw the creation of serious Chinese doubts about the reliability of the Sino-Soviet military alliance. Substantial US military and political backing for Chiang Kai-shek during the Taiwan Straits crisis was in marked contrast to the slow, cautious, and grudging Soviet support for Peking. If there had been any doubts, the Straits crisis must have convinced Mao and the Central Committee that they needed an independent capability. Soviet inaction weakened P'eng's political position considerably, since he had become closely identified with the Soviet alliance.

P'eng's position was further weakened by the terrible beating his air force took at the hands of Nationalist pilots.[26] If that was a sample of all the military efficiency P'eng could deliver, after seven years of Soviet tutelage, maybe the whole approach was as unreliable as the alliance had proven to be.

Change came, suddenly and profoundly. A new training program incorporating Soviet advanced experience in modern military techniques was not approved; in fact, it was never heard of again. After an interim between January and April, 1958, high officials and elite publications proclaimed an entirely new military line, much of which represented a 180-

degree switch from that which prevailed only a few weeks previously. Paraphrased, the themes of the new line were:

(1) It is despicable to rely on foreign countries, foreign military experts, and foreign military textbooks, and to despise one's own national military heritage.

(2) Men are what count, not weapons. Revolutionizing an army is more important than modernizing it. Politics and the inclination of people's hearts, not military technique, are what decides victory or defeat in war.

(3) Slavish reliance on the Soviet Union (by name) has had a very harmful effect on Chinese military modernization, and has caused defects and detours.

(4) The nation in arms, a vast militia, organized in communes, is the best form of mobilizing for total war.

(5) Mao's military thinking ("People's" guerrilla war) is still valid, even for modern war. Some military cadres, "especially senior cadres," are "grossly in error" in overlooking this.

(6) "Dogmatism" is the blind following of foreign experience. Such fetters should be broken off, and combat tactics made to conform with actual conditions in China.

(7) Such "poisonous" dogmatism has "a deep ideological source." If one recognizes dogmatism and the "purely military viewpoint" as the antithesis of the correct line, then the correct military line of the Party and Mao can be better comprehended.[27]

One of the results of these new themes was Mao's call for "Everyone a Soldier" which sent PLA regional forces headlong into a massive crash program in militia training. Late in 1959, the PLA was blamed when the militia expansion flopped. The agonizing reappraisal of 1958's overblown production statistics also revealed that the "Everyone a Soldier" movement had been a disaster. The program had resulted in paper militia units, corruption, and even some cases of units taking weapons and becoming bandits.

A major contributory cause of the frenetic "Great Leap Forward," officially launched in May 1958, was the need to build up rapidly an economic base to support China's military needs. According to Peking, national construction had to carried out at "top speed" if China's security was to be fully guaranteed; the building of modern industries would be a "prerequisite for modernizing our national defense," and all sense of inferiority or of "depending on other people" would have to be done away with, for any "lack of confidence in the nation is tantamount to the lack of confidence in the capacity of the 600,000,000 people for innovation."[28]

Suddenly, on September 17, 1959, the dismissal of Marshal P'eng and four vice-ministers was announced. P'eng was charged with heading an "anti-Party group." And, indeed, he had directly challenged Mao at the Lushan Central Committee plenum in August, 1959.[29] Moreover, P'eng had

apparently written a letter to the Soviet Communist Party attacking Chinese Communist policies. P'eng may have been disturbed that the growing breach with the USSR jeopardized Soviet arms aid.

The deterioration of Sino-Soviet relations over the next year was rapid, and finally erupted in April, 1960, with the publication by the Chinese of an ideological attack on the Russians. In July and August, 1960, the Russians withdrew their 1,300 economic and military advisors and technicians. This action was drastic, sudden and virtually complete.

The Sino-Soviet split and the abrupt withdrawal of Soviet advisors in 1960 left the Chinese defense industry with half-built factories, partly completed assembly lines, blueprints without prototypes, and prototypes without blueprints. Production lines for a copy of the MiG-19 fighter (called the "Shenyang F6") were still incomplete. Despite the setback, F6 production was to begin in the early 1960s. The Soviets also left behind two examples of the MiG-21F. After a herculean effort of "reverse engineering," a Chinese copy called "Shenyang F7", was to fly in late 1964, and entered service in 1965. [30]

As we shall see again in the next chapter all aircraft in production incorporate outdated technology. The Chinese have sought to cloak the problem by constant improvement of performance and detail. This extends right into the operational squadrons of the PLAAF, which are required to

"remodel" frontline aircraft, incorporating new improvements.[31]

Since the sudden virtual cessation of Soviet military and economic assistance, there has been almost no Sino-Soviet military relationship. The effects, even in the short run, have been significant for the Chinese. The Chinese have had to recognize that China must "mainly rely on our own efforts" in the future. Thus, when Malinovsky was threatening the Chinese in 1962, Marshal Ch'en Yi was saying that all the Chinese problems including "national defense" could be solved by self-reliance.[32]

During the late 1950s, the PRC pursued a rigorous program of military industrialization based on the Soviet model. A succession of machine-building ministries (MBM) were formed and reformed to cope with domestic arms production. Although the Sino-Soviet rift led to a termination of direct cooperation, the Soviets left in place an enduring industrial framework in the form of the Chinese defense-industries system which structurally changed little in the next three decades. In effect, the Soviet model meant a unitary defense-industrial system of factories that were largely, if not totally, dedicated to the production of major weapons systems.[33]

From 1949 to the late 1950s the task of building the new China had been pursued in accordance with the Marxist

ideological basis of the Chinese Revolution and with extensive scientific and technical assistance from the Soviet Union. By 1957, Mao had concluded that the Soviet approach to industrialization was inappropriate for the unique needs of China, and in 1958 he launched the abortive attempt to dramatically accelerate economic growth known as the Great Leap Forward. Chinese leadership again learned the shortcomings of relying on foreign sources for military weapons and weapons technology. The Soviet Union proved to be an unreliable ally while it emphasized again China's need for self-sufficiency.

NOTES

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4. Richard M. Bueschel, Communist Chinese Air Power (New York, 1968), p. 19.
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CHAPTER THREE

Politics vs Economics

Despite the "peoples war" rhetoric of the 1960s, there was large-scale development and production of improved types and large quantities of military equipment. After the fall of Lin Piao (in September 1971), military procurement dropped precipitously while agricultural mechanization was given renewed emphasis. Unlike industry, R&D was relatively immune from political interference during the Great Leap Forward, and military R&D continued to advance. Military industry achieved remarkable results in the early 1960s. Defense industry and R&D were initially shielded from the Cultural Revolution, as well. The educational and research systems atrophied badly from 1965 to 1976. Under such conditions, the science and technology situation could only become worse.

Although Soviet aid ended in 1960 with the final withdrawal of the military advisors and technicians, there are some indications that the construction and modernization programs associated with conventional weapons had either been completed or were at levels where the Chinese could complete them by themselves by the early 1960s. As early as November, 1956, the Liberation Army Daily had suggested the Chinese would soon be able to produce the entire range of new weapons introduced in the 1950s. Some western authors credit the Chinese with self-sufficient production of

light and medium weaponry in the early 1960s.[1]

But while production facilities may have been ready, actual production undoubtedly was reduced as a result of the withdrawal of Soviet technicians. One can only guess at the level of output. Assuming that the production of the present family of conventional weapons followed the same general pattern as Chinese industrial output, production may have reached a peak in 1958 or 1959, slipped downward in the early 1960s, and then subsequently experienced a general upward trend at least until the disruption associated with the Cultural Revolution in the late 1960s. There is a hint that the production of infantry weapons and perhaps tanks was considered by some Chinese leaders to be more than sufficient for their own needs as early as 1966, because the Chinese were willing by that date to export infantry weapons to Vietnam.[2]

Before World War II, modern industry in China, to which the production of nonnuclear weaponry is tied, was confined largely to the great seaports - Shangai and Tientsin in particular - and to Japanese held Manchuria. As late as 1948, only 18 cities in 13 provinces (excluding Manchuria) had sufficient manufacturing capacity to be considered even modest industrial centers; 10 of China's 26 provinces and autonomous regions had no modern industrial complexes. East and North China together accounted for

about 80 per cent of the factories and industrial employment in China proper.[3]

The Communists saw this as unsatisfactory and, during the first five-year plan, announced a major effort to develop new industrial regions and bases, including Taiyuan, Shi Jia Zhuang, Loyang, Zheng Zhan, Chu-chan, Meng-yang, Lanzhou, and Xian, and bases for major iron and steel complexes were to be laid at Bao tou in Inner Mongolia and at Wuhan.[4]

The effort to move industrial complexes westward and modify the excessive reliance on Manchuria and the coastal provinces was only partially successful as of the late 1960s. The initial exuberance of the first five-year plan concerning the westward march of industry was replaced as early as June, 1956, by a retrenchment and shift in investment back toward established industrial complexes. Some Chinese leaders argued at the third session of the first National People's Congress that greater reliance had to be placed on existing industrial bases. By the mid-1960s, the older industrial bases were clearly being given priority for investment. In retrospect, the policies and programs of the 1950s and 1960s had the effect of industrializing Henan, Hunan, Anhui, Shanxi, and Inner Mongolia, but, at the time, increasing greatly the level of industrialization in the older centers of modern industry. As of the late 1960s, there were nine large industrial

centers in China; with the exception of Bao tou in Inner Mongolia and Wuhan in Hupeh province, these centers were located in the same areas of modern industry that had existed at the end of World War II.[5]

After 1960 an unavoidable policy of self-reliance compelled the Chinese to take stock of how they could best manage their defense industries without Soviet assistance. During the early 1960s the Chinese system underwent further reorganizations to ensure that the limited industrial as well as scientific and technological (S&T) resources of the nation were managed effectively. With hindsight we can see that the restructuring of the ministries of machine industries (MMI) that took place in the early 1960s reflected the influence of particular policies and programs. Specific MMIs were established to oversee the development and production of nuclear weapons (second MMI), aircraft (third MMI), electronic equipment (fourth MMI), ordnace (fifth MMI), naval vessels (sixth MMI), and ballistic missiles (seventh MMI). (The first MMI was for agricultural equipment.) In other words, the Chinese committed themselves to the development of a defense posture and supporting industrial structure that reflected a significant concern with strategic defense issues. Publicly, of course, the Chinese continued to emphasize the idea of people's warfare and guerrilla warfare, but the long-term investment in heavy armaments betrayed more than a minor commitment to defense modernization.[6]

Managing the defense industries and coordinating key industrial decisions was and continues to be a major concern of the Chinese leadership elite. The formation of two other organizations during the late 1950s and early 1960s represented efforts to cope with coordination problems. These were the National Defense Industries Office (NDIO) and the National Defense Science and Technology Commission (NDSTC). The separate formation of these organizations was significant because it underscored a persistent difficulty: the problem of effectively integrating scientific research (that is, research and development) and industry (that is, manufacturing processes). The successful integration of scientific enterprises with industrial requirements has been a problem in all societies. The severity of the problem in China was suggested by the organizational separation of the management of scientific and industrial functions and the frequent conflicts between the NDIO and NDSTC. At the heart of the matter was a lack of cooperation and coordination between R&D facilities that were operationally controlled by personnel of the People's Liberation Army through the NDSTC - but often were co-located with civilian-controlled defense factories - and the defense industries themselves, which were functionally represented by the NDIO and which apparently were dissatisfied with the lack of production-oriented research that was being done for them by the NDSTC's institutes and academies.[7]

As is well known, industrial production was badly disrupted by the Great Leap Forward (GLF). Moreover, considerable loss of producer's goods resulted from misuse and lack of proper maintenance. This, plus the diversion of capital and materials to such abortive schemes as the famous "backyard" blast furnaces, contributed to the economic disaster which forced a retreat to more moderate policies by 1961. Unlike industry, R&D was relatively immune from political interference during the GLF, and military R&D continued to advance. Military industry achieved remarkable results in the early 1960s. Until 1962, economic emphasis was on heavy industrial and militry production and development. This has resulted in an overall growth rate of about eight percent per annum for industry since 1949, as compared with only two percent for agriculture.[8]

Defense industry and R&D were initially shielded from the Great Proletarian Cultural Revolution, as well. As late as August, 1966, a Central Committee directive specifically exempted scientific and technical personnel from the GPCR. Scientists were praised, even as other intellectuals were being assaulted. In 1967, however, the push from the radical left led to attacks on "bourgeois revisionism" in scientific work. Leading scientists were criticized for their foreign educations and their alleged reliance on foreign books and techniques, as well as their resistance to ideological control.[9]

By mid-1967 the NDSTC and Nie Rung Zhen, deputy Chief of the General Staff, were under attack from two quarters. In August, the radicals of the Central Cultural Revolution Group sponsored a "Conference of Criticism and Struggle Against Revisionism" in the NDSTC as part of the attack on "capitalist roaders in the army". Despite an apparent "power seizure" in the NDSTC in January, the commission had continued "business as usual" to the extent of actively recruiting aircraft and rocket designers and engineers in Germany. The radicals could make a good case for claiming that Nieh was "suppressing class struggle" in the NDSTC.[10]

Taking advantage of the radical ideologues' offensive against the NDSTC, various interests in the defense MMIs, with Red Guard factions of their own, launched an attack on Nieh and the R&D system he dominated. Radical ideology and bureaucratic competition became entangled in a welter of factionalism, especially in the research institutes, academies, and experimental factories of the Sixth and Seventh MMIs. There was relative calm both in the large factories and in the "pure science" facilities. This wasn't too surprising, since young intellectuals, universally the most volatile and factious elements in the GPCR, were concentrated in the institutes and academies. In April, 1968, Chou En-lai told representative of 7MMI factions, "You young intellectuals must learn to temper yourselves a bit in the revolutionary movement."[11] Chou was telling them that

they had gone too far in distrupting the system.

This April conference was one of several which Chou and other top leaders held through the first half of the year, in a frustrating effort to bring peace and restore productivity to the defense industrial and scientific system. Despite such efforts, turmoil continued well into the summer. "Revolutionary Great Alliances" of the factions in a particular organization were repeatedly formed at conferences in Peking only to dissolve within hours of the representatives' return home. Published transcripts of these conferences leave no doubt that defense production suffered extensively. In May, armed clashes in a number of R&D academies in Peking reportedly claimed a number of lives.[12]

Concentration of R&D work in the hands of a technical elite remained ideologically suspect. Moreover, the Cultural Revolution, which hailed the creative wisdom of the laboring masses, had resulted in the suspension of virtually all educational activities in China. When schools finally began to reopen, the ever-increasing need for scientists and technicians was to be met by a "revolutionized" educational system. Political, rather than academic , criteria determined which students went to college, while curricula were abbreviated and skewed toward "practical" low-technology skills.[13]

In the wake of the Soviet invasion of Czechoslovakia

in 1968 and the fighting between Soviet and Chinese troops on the Ussuri River in March 1969, military spending rose to a peak in 1971. But it fell substantially in 1972 and thereafter stayed at a plateau roughly equal to the 1969 level for the remainder of Mao's life.[14]

These expenditures went into, among other things, the production of items for the Chinese military inventory. China's indigenous arms industry, based largely on the technology and plants furnished by the USSR before the Sino-Soviet break in the early 1960s but sometimes embodying advancements of Chinese origin, turned out destroyers, aircraft, some electronics, and a range of general equipment. However, these systems, though sturdy and reliable, almost universally failed to measure up to like systems of Soviet and American manufacture in terms of performance. In addition, the Chinese developed nuclear weapons on their own - of necessity, because Moscow failed to provide the level of support that Peking had anticipated.[15]

To move beyond such production capacities and toward a self-sustaining design and manufacturing effort proved to be far more difficult, and only modest beginnings have been made in this realm. The first such step is the ability to undertake modifications and improvements of existing designs. This goal has been pursued by Chinese scientists and engineers in certain areas of defense production since

the late 1960s, but with very uneven results. The Chinese felt the need to break free of past restraints and demonstrate an ability to undertake autonomous design and manufacture which is understandable in the context of asserting national independence, but not easily realized. China's experience with the F9 (known as A5 in the fighter-bomber version), the nation's first domestically designed and produced fighter-aircraft, offers an instructive example. Since first appearing in 1970, the aircraft has been produced in only limited numbers, and is judged a failure or only a partial success by many military observers. Indeed, whether the aircraft should be deemed wholly Chinese or simply a modified MiG-19 remains an open question. Such problems illustrate the long-term effects of technological dependence, given the disparate, highly complex skill that are called upon in the manufacture of sophisticated weaponry.[16]

The situation with bombers was even worse. The Soviet Il-28 "Beagle", a design dating from the late 1940s, is still in front line service in its Chinese-made version (called "B5"). The Soviet Tu-16 "Badger-A" medium-range bomber was supplied to the PLAAF in the 1950s. "Reverse engineering" began in 1962, and after considerable resource expenditure, production of the Chinese version (called "B6") began in 1968. Then, in 1972, the Chinese discovered that newly purchased Boeing 707 airliners were far more

sophisticated than the B6, which was evidently more obsolescent than they had even expected. Nevertheless, limited production apparently continues. Reportedly, a few were sold to Pakistan, and spare parts have been supplied to Egypt.[17]

By the mid-1970s signs began to emerge of heightening Chinese concern about the deficiencies in the national defense structure. Speaking at the Fourth National People's Congress in January 1975, Chou En-lai defined China's task for the 1980s and beyond as "to accomplish comprehensive modernization of agriculture, industry, national defense and science and technology so that our national economy will be marching in the front ranks of the world."[18] This statement, to be sure, did not depart in principle from much that had been said before. Moreover, moving the nation forward from its original "poor and blank" position - to use Mao's formulation - was a task to which all could subscribe. Nevertheless, in combination with such subsequent actions as the conclusion in late 1975 of a deal to purchase Spey airplane engines from Great Britain, Chou's remarks did suggest increased attention to the shortcomings of the PLA and the supporting production infrastructure.

If there proved to be great difficulties in moving beyond existing models and systems, then the capability to truly engage in an indigenous design and production effort has proved to be even more difficult. This level of

scientific and technological competence still remains the exclusive preserve of the major industrial powers, and seems certain to remain so for the foreseeable future. Chinese military planners are under no illusion about the potential sources of technology for their current effort to upgrade the nation's defense capabilities. Now, as in the past, China must look abroad.

Given the enormity of China's needs and the sheer size of its armed forces, the outright purchase of weapons from abroad, even on an extended credit basis, makes little sense as a long-term policy. In addition, undue reliance on grants, purchases, and transfers still leaves them potentially vulnerable to the vagaries of the supplier state's policies and capacities. Rather than risk such dependence, one must attempt whenever possible to both broaden the sources of supply and acquire the ability to manufacture components or complete weaponry on Chinese soil. Thus, one seeks more than mere prototypes or outright transfers of particular weapon systems. By acquiring the means of production itself - through the building of indigenous production facilities and the training of Chinese scientists and engineers to oversee such operations - military planners hope to be able to maintain their autonomy from external control.

It is in this context that the Sino-British jet engine agreement of late 1975 is most appropriately viewed.

Negotiations were initially undertaken as early as 1972, and proceeded more intensively during 1974 and 1975. The final agreement included contractual obligations in three separate areas: (1) the initial supply of 50 supersonic Spey jet engines (the RB 168-25R, presently used in the British version of the Phantom F-4 and the Vought A-7 Corsair II close-support aircraft); (2) a license to manufacture these engines in China in a plant that was being built near Xian; and (3) the furnishing by Rolls Royce to the PRC of facilities and technical expertise for engine testing and maintenance. The ultimate result was to advance Chinese jet propulsion technology by a least a half-dozen years, and provide China with the facilities to produce and maintain such engines on an independent basis in the early or mid-1980s. With Chinese personnel ultimately exercising full control over such plants, there would have been no possibility of undue (or unexpected) leverage being applied by the supplier state. It was hoped that the Chinese air force would for the first time possess an engine for fighter-aircraft whose capabilities and limitations were not intimately understood by their Soviet adversaries. [19]

But in the long run, the most serious brake on China's economic and industrial development has proven to be a self-inflicted one. From 1966 to 1976 radical politics dealt repeated setbacks to the educational system which must produce scientists, engineers, managers, technicians, and

skilled laborers. "Maoist" worship of the "wisdom of the masses" produce a strong tendency to undervalue formal education, and to view foreign intellectual or technical influence as unnecessary or outrightly treasonous: The conscious emphasis, especially during the Cultural Revolution, on practical experience, on "learning by doing"; closing universities for several years, and the proletarianizing reforms of tertiary education (reducing admission standards shortening curriculum) could not help but retard the development of a technical labor force with skills and educational standards comparable to those of the Western world. It takes decades to develop such a force. . .[20]

While the overall record of the Cultural Revolution in science and education is clear, there is also considerable evidence of pockets of low-level research activity and of a considerable amount of "closet-scholarship," which attests to the dedication of China's intellectuals to their professions. As became evident in the late 1970s, there was a dedicated core of intellectuals prepared to reassume leadership and activity in research and development as soon as the political opportunity presented itself.

Even if all Chinese engineers were to reemerge from the political closet there would be very few of them. One study from the mid-1970s estimated that there were approximately 1.3 million scientists and engineers of

varying qualifications in the PRC - and surely not all were in defense work. Those trained in the West are aging; those trained in the Soviet Union are no longer young; and Teng Hsiao-p'ing himself has noted that scientists trained in China after 1949 are of uneven quality. Human capital takes takes the longest of all national sets to develop and remains China's greatest single deficiency.[21]

Already by 1975, it required more trained personnel than were available just to absorb the technology that was then being purchased abroad. Even the internal expansion of industry was forcing the state to "rob Peter to pay Paul". Cadres from local government and the PLA were transferred to industrial enterprises, where they were admittedly "technically inexperienced," but had "high political consciousness and work very hard." Established factories were levied for veteran technicians and workers who served as "cadres of worker-teachers" in new ones.[22]

The worship of politics, production and "practical" skills exacerbated the tendency to refine proven products, while failing to make really new technical departures. Pioneering breakthroughs in US and USSR typically originate from "pure research," which was ideologically suspect up to 1977. The educational and research systems atrophied badly from 1965 to 1976. Under such conditions, the science and technology situation could only have worsened.[23]

NOTES

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14. Admiral Turner's testimony to a subcommittee of the Joint Economic Committee of the US Congress, in Allocation of Resources in the Soviet Union and China - 1977, 1977, Washington, D.C. p. 32.
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16. Onkar Marwah and Jonathan D. Pollack, ed., Military Power and Policy in Asian States: China, India, Japan (Boulder, 1980), p. 7.
17. Jencks, p. 197.
18. Fraser, p. 36.
19. Marwah & Pollack, p. 80.
20. Jencks, p. 193.
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22. Jencks, p. 209.
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CHAPTER FOUR

"Major Political Watershed"

The death of Mao Tse-tung and the overthrow of the so-called "Gang of Four" in 1976 constituted a major political watershed, and some of the most immediate policy reversals occurred in the areas of science and technology and in higher education thus influencing military industrialization adversely. Within about a year of this watershed, concrete steps were taken to lay down the broad lines of a new science and technology policy. The role of scientific personnel in Chinese society was redefined. In the more "radical" policy phases, such as most of the 1966-76 decade, there had been a deliberate attempt to minimize the differences and potential coflict between "red" and "expert" and between those who perform manual and mental labor by merging those roles. The "experts", i.e., intellectuals in general, were subjected to political education and required to engage in productive labor, while workers and peasants were deemed capable of making scientific achievements equal to those of the "experts", and political cadres were placed fully in charge of science policy. Starting in 1977 it was argued that modern society requires a division of labor between "red" and "expert" and between manual laborer and intellectual, each making a unique contribution to the advancement of the society.

The last years of Mao's life can best be viewed in

terms of a shifting balance between two groups. Some individual leaders argued for building weapons now, while others favored the development of an adequate industrial base as the first priortiy. Some pushed for substantial modernization, and others saw the PLA as adequate for its primary function as a domestic force.

The Chinese have tended to favor "quick fix" methods for producing what they see as modern weapons systems rather than create a foundation for more comprehensive, unified defense planning over the long term. As a result, Chinese defense planners have had little experience in coordinating production of both defense and civilian industries. This, in turn, has contributed to the creation of a redundant dual structure of civilian/military scientific and technological research and development operations in which there is little spill-over from one sector to the other. Moreover, China's past failure to coordinate national research efforts with defense doctrine has produced, among other things, conspicuous gaps in military communications systems (C^3I),[1] in integrated circuit/computer production, in advanced battlefield electronics, and in engine/aircraft construction.

With the death of Mao Tse-tung and the subsequent purge of the "Gang of Four", China's new pragmatic leaders have embarked on a crash program of national development

known as the "Four Modernizations" first proclaimed by Chou En-lai. Ever since the program was publicly revealed in 1978, defense has vied with science and technology for third position in the country's overall modernization efforts (behind agriculture and industry). This program is geared to the primary objective of turning China into a major world economic and military power by the year 2000.

China's current modernization drive began with the Ten-Year Plan (1976-1985) belatedly promulgated by Hua Goufeng in February 1978 (and therefore sometimes called the Eight-Year Plan). This economic plan originally called for the construction of 120 large-scale industrial projects, including 10 major iron and steel complexes, 9 nonferrous metals facilities, 8 large-scale coal combines, 10 new oil and natural gas fields, 30 major hydropower stations, 6 new trunk railways, and 5 key harbors. Major sectoral targets of the Ten-Year Plan included a projected doubling of steel production to 60 million tons per year, a 125 percent increase in gross industrial output, and a 50 percent increase in annual food production.[2]

In part because these original targets appeared excessively ambitious and in part because they stressed too heavily large-scale capital investment in a few key sectors of heavy industry (at the expense of augmented investment in the chronically sluggish agricultural sector as well as in the critical, growth-inducing sector of light industry),

the initial programmed objectives outlined by Hua Kuo-feng in February 1978 were substantially readjusted and scaled down a year later. Thus, in the spring of 1979 the projected 1985 target for steel production was lowered by almost 50 percent to a more modest 45 million tons and the projected industrial growth rate was reduced from more than 10 percent annually to a more manageable 8 percent. At the same time, it was announced that industrial investment would be cut from 54.7 percent of the state capital investment budget to 46.8 percent, while agricultural investments would correspondingly rise from 10.7 percent to 14 percent.[3]

In the short run the generation of investment capital to underwrite the "Four Modernizations" will depend largely upon China's ability to earn foreign exchange. It is for this reason that, in the course of China's economic readjustment of 1979, highest priority was placed on the rapid expansion of light industrial capacity (including the attraction of foreign capital through compensatory trade and joint stock ownership schemes), while the originally projected plans for new heavy industrial construction were temporarily scaled down until the light industrial investment pump could be sufficiently primed. In the meantime, heavy industrial expansion will occur primarily through renovating existing plants and equipment, rather than through the construction of expensive new facilities.[4]

Within the machine-building industry, the "eight character slogan" ("Readjust, Restructure, Consolidate, Improve"), announced in mid-1979, reaffirmed the reorganization and goals announced in August 1978, but the priority of military industry was clearly lowered. Moreover, military plants were ordered to devote productive capacity in excess of PLA needs to the production of goods for civilian consumption and export, and were told to assist civilian industrial and agricultural units. This measure to "turn deficits into profits" in the usually underutilized defense factories should go far to break down the long-standing separation of the military and civilian industrial sectors.[5]

Throughout the PRC's existence, China's defense industrial system has been sharply segregated from its civilian counterpart. In recent years, however, it has become increasingly evident to Chinese leaders that such an institutional approach has not only failed to meet the challenge of external military threats but has also failed to utilize fully the nation's defense-related industrial infrastructure. The pragmatic leadership's remedy has involved organizational changes designed to integrate science and technology into a coordinated approach to civilian and military production, as well as efforts to bring about a break with past practices.

While it is fairly clear that the PRC's highly

centralized defense production infrastructure has remained similar to that in the USSR, recent initiatives undertaken by the Chinese modernists reveal a determination to shake loose from such a model. The new "Chinese way" that is thus emerging consists of a determination to effect the integration of military and civilian production and to link military modernization to China's overall economic development. Former Defense Minister Xu Xianggian's October 1979 statement directing national defense efforts to be undertaken with existing weapons inventories, even as newer ones are being developed, has remained the CCP's policy for the gradual acquisition of S&T relevant for advanced weapons design programs.[5]

The turning outward of the PRC and the vigor of its pursuit of the "Four Modernizations" (the modernization of agriculture, industry, national defense, and science and technology) have begun to produce significant actions toward military force improvements. Not surprisingly, Peking has made no public announcements of formal, complete force improvement programs or goals; moreover, there has thus far been more discussion than acquisition. Nevertheless, some movement has taken place. In their talks with foreigners at home and abroad, for example, Chinese leaders have shown a remarkable consistency with regard to the type of military equipment in which they have displayed interest. Peking has

also taken a number of internal steps that relate to the desire for a more modern PLA. While the Maoist canon of "people's war" has not been repudiated, its place in the strategic and tactical outlook of China is being subtly altered through important changes in the structure and functioning of the military establishment.

Even though Peking has not announced publicly its near-term goals with respect to military modernization, there is evidence that permits us to draw some inferences about them. Table 1 shows the principal types of weapons, equipment, and technology in which the Chinese have indicated an interest. A number of references clearly relate to the same item (most notable, the Harrier VSTOL aircraft), but this sort of reinforcement is testimony to the genuineness of the Chinese interest.

Table 1. Types of Weapons, Equipment, and Technology in which China has Expressed Interest Since January 1, 1977 7

Type	Percent of sample
Whole aircraft and spares	34.1
Anti-tank weapons	17.6
Shelter, nuclear attack	9.5
Anti-submarine warfare gear	7.1
Computers with military applications	5.9
Reconnaissance and communications satellites	5.9
Anti-aircraft weapons	4.7
Tanks and armored personnel carriers	4.7
Nuclear weapons and missiles	3.6
Naval engines	2.3
Submarines	1.2
Equipment for ships of over 10,000 tons	1.2
Laser applications	1.2
Bridging equipment	1.2
	100.1*

*Discrepancy due to rounding.

This list has an impressive logic of its own. More than half of the items look directly to defense against an invader. Interest in aircraft did not include any apparent interest in long-range bomb-delivering systems. The single most frequently mentioned was the Harrier AV-8 - an aircraft capable of vertical and short take-offs and landings. Although difficult to maintain, this highly sophisticated machine can operate from primitive forward airfields. Other items on the list indicate recognition of a need for significant improvement in tactical defense: anti-submarine warfare and anti-aircraft systems, anti-tank performance against large armored formations, and improvement of battlefield mobility by new forms of transport.[8]

For a long time, China has maintained a modest military assistance effort. Help has been extended to a variety of revolutionary groups, but the comparative cost has not been high. Military assistance of more significant size has gone to such clients as Tanzania and Pakistan. Even in some of these cases, however, China has ultimately found itself "priced out of the market" by other donors. In June 1979, President Anwar al-Sadat of Egypt announced that China would supply weapons to Egypt. (As early as 1976 Egypt had furnished samples of Soviet equipment to Peking.)

China has a genuine desire to become a major arms ex-

porter. The Xian/Chengdu factories are exporting their F-7 (MiG-21), while the Shengyang, Shanghai, and Nanchang factories are receiving more and more foreign buyers from the Middle East and Latin America.

In 1984, China sold almost US $2 billion worth of arms abroad. That propelled it into the exclusive "top-six club". The Chinese aim is to sell low-level, reliable technology abroad to earn hard currency to buy more sophisticated arms for their own forces and to modernize their own factories.[9] Even though much of the Chinese equipment is based on Soviet designs of the 1950s and 1960s vintage, the Chinese clones are said to be of far higher quality than the original Russian equipment. Western military observers say that the prices of some of the Chinese-made weapons offered by Norinco (China North Industries Corp.) - among them armored personnel carriers, multiple rocket-launchers, self-propelled guns and anti-tank missiles, as well as rifles, grenades and ammunition - undercut those of Western manufacturers by up to 50 per cent.[10] Norinco, the government ground-ordnace company, is also involved in purchases of foreign technology to aid in the diversification of military factories to produce exportable civilian items. For example, Norinco last year (late 1985) imported pump technology to be incorporated in equipment for export to the Asian petroleum market.

Significant information on Chinese defense equipment

is now becoming available following a decision to enter the highly competitive world arms market. Chinese defense equipment is well suited for use in many parts of the world and significant sales have been made to a number of countries, including Iraq.

Although China has been exporting light armored vehicles to Africa, the Middle and Far East for some time, especially the Type 63 light amphibious tank[11] and the Type YW 531 (Type-63) series of armored personnel carriers, technical information on these vehicles had been difficult to obtain and often contradictory.

China recently provided Western and Arab officials with views of what appears to be a prototype infantry fighting vehicle (IFV), the WZ-501. It is a vehicle strikingly similar to the Soviet BMP-1 IFV with 73mm gun and 'Sagger' anti-tank guided missile system. The latter is already produced in China, as the 'HJ-73' ATGM. Whether the vehicle is a copy of one obtained from Egypt (or other sources) is not known, but it is being advertised by the Chinese as available for export. As such, it may be only a matter of time before the WZ-501 enters service with the PLA's mechanized infantry regiments. [12]

Norinco and Vickers Defence Systems of the UK have signed an agreement covering a new mechanized infantry combat vehicle (MICV) called the NVH-1. [13]

Under the first phase of this agreement signed in 1985, each company will undertake an independent world-wide study for the market potential of the NVH-1, after which the results will be jointly analysed. If they are positive, a prototype vehicle will be constructed for overseas demonstrations.

The NVH-1 (N - Norinco, V - Vickers) will consist of the, until now, unknown Chinese H-1 armored personnel carrier, which is a much improved version of the Type 531 vehicle which has been in service with the Chinese Army for some time and has been exported to a number of countries including Iraq. [14]

China has recently issued fairly comprehensive details of the Type 69 II MBT and this confirms that the Type 653 medium tank recovery vehicle is based on the chassis and automotive components of the Type 69 II MBT, not the Type 59 MBT as previously assumed.

Chinese sources state that the Type 69 II has been developed specifically for the export market. Iraq is reported to have taken delivery of at least 200 Type 69 II MBT.[15] Table 2 indicates there has been a steady rise in tank production since 1980.

The Type 69 MBTs were first seen during a parade held in China in late 1982. These vehicles had infra-red night vision equipment for the commander, gunner and driver, laser rangefinder over the main armament, but no

side skirts. The main armament, then reported to be a 105 mm/106 mm/115 mm smoothbore gun, also had a bore evacuator, but more to the rear of the muzzle than on the more recent Type 69 II MBT.

Some Type 69 MBTs have also been observed fitted with an external stowage bin on the turret rear, armor protection for the anti-aircraft machine gunner and the same skirts as fitted to the Type 69 II. Another report mentions a Type 69 with the same Western 105 mm rifled tank gun as retro-fitted to some Type 59s seen for the first time in 1984 during a parade in Peking, and with new tracks with removeable rubber pads and side skirts. [16]

Table 2. China's Armored Vehicle Production [17]

Type	Years			
Medium Tanks (MBT) (Type-59, -69)	1978	1979	1980	1981
	700	1000	500	600
	1982	1983	1984	1985
	1200	1500	1500	1700 (est)
Light Tanks (Type-62)	1978	1979	1980	1981
	100	50	50	(Production Ceased)
Armored Personnel Carriers (APC)	1978	1979	1980	1981
	100	200	600	500
	1982	1983	1984	1985
	300	300	400 (est)	500 (est)

Norinco is also offering for export towed artillery based very closely on existing Soviet designs, but there are

some slight alterations to most models to suit both local production methods and the requirements of the PLA. Their mortars display a wider range of influences, ranging from Soviet designs to Stokes-Brandt and US origins. They are all sturdy weapons with no frills.[18] Also offered for export are three types of artillery rockets. Two of them are conventional artillery rockets with calibers of 107 mm and 130 mm, but the third is strickly speaking a piece of engineer equipment using rockets to lay anti-tank minefields.[19]

In China the anti-aircraft gun has never suffered the lack of attention it has had from Western nations during the last two decades. The People's Liberation Army has always made great use of light anti-aircraft weapons well down the unit scale and continues to do so to the extent that it now has on offer, via Norinco, a list of automatic weapons in the 12.7 to 57 mm range. One caliber that Norinco has not released any information on is its 23 mm weapons based on the Soviet ZU-23 series. It is known that such weapons are used in China but no information, as yet, is forthcoming.[20]

But China is also in the market for mid-1970s technology and manufacturing equipment to produce and up-grade its military equipment for export. During an official visit to Shenyang in September 1980 a delegation from the US Defense Department was allowed to see what was then

described as 'a prototype' of China's J-8 air superiority fighter (NATO 'Finback'), the existence of which had been known and openly reported since the mid-1970s. At the time of the 1980 visit it was said to be powered by a single Tumansky R-11 turbojet engine, although there were suggestions that this might be replaced in due course by the Rolls-Royce Spey turbofan, for which China had acquired a preliminary manufacturing license in 1975. [21]

A week after this visit, US Aerospace industry officials were refused similar permission to inspect the J-8, the stated reason being that the factory had been closed for the installation of production tooling. However, the Spey program failed to materialize due to problems integrating the engine with the airframe, and subsequent reports described the J-8 as "still undergoing development."[22]

The Chinese version of the Mikoyan MiG-21 day fighter was based originally on a small number of Soviet-built MiG-21F 'Fishbed-Cs' delivered to China before the political break with the USSR in 1960. Yet the task of 'reverse engineering' not only the airframe, but also the Tumansky R-11 turbojet engine (built at Chengdu as the Wopen-7 or WP-7) and other equipment, was accomplished sufficiently quickly for the first Chinese-built example to make its maiden flight in December 1964. As the J-7, it began to enter service with the PLA Air Force the following year.

Table 3 indicates export designations and their origins.

Table 3. China's aircraft products [23]

Chinese export designations	Type	Origin
Shenyang aircraft factory		
JJ-5/FT-5	fighter/trainer	MiG-17
J-6/F-6	fighter	MiG-19
JJ-6/FT-6	fighter/trainer	Development of MiG-19
J-8/F-8	fighter	MiG-21 (twin engined)
Xi'an aircraft factory		
J-7/F-7	fighter	MiG-21F
H-6/B-6	bomber	Tu-16
Y-7	transport	An-24
Design stage	supersonic bomber	(seeking partners)
Design stage	high-performance trainer	
Shanghai aircraft factory		
Y-10	transport (research)	similar to B707 (uses P&W engines)
Hanzhong aircraft factory		
Y-8	transport	An-12
Nanchang aircraft factory		
Q-5/A-5	attack	MiG-19
CJ-6	basic trainer	similar to YAK-18
Harbin aircraft factory		
H-5/B-5	bomber	Il-28
Z-5	helicopter	Mi-24
Z-6	helicopter	Mi-8
Z-9	helicopter	license-built Dauphin
Y-11	utility	An-2 replacement
Y-12	STOL transport	Y-11

Key

JJ Jianjiaoji - fighter/trainer
J Jianjiji - fighter
H Hongzhaji - bomber
Y Yunshuji - transport
Q Qiangjinji - attack
Z Zhishengji - helicopter

Export versions of the aircraft, designated F-7, have been exported in some numbers to Egypt and to Iraq. Some of these aircraft, and Egypt's Soviet supplied MiG-21MFs, are being retrofitted with a new head-up display and launchers for AIM-9P3/4 Sidewinder AAM. [24]

In 1984, China released details of an improved export version known as the F-7M. This differs mainly in having modern Western-made avionics, Which include a GEC Avionics Type 956 HUDWACS (heads-up display and weapon-aiming computer system) instead of the optical sighting system; a more effective Chinese Type 226 or GEC Skyranger ranging radar with improved anti-jamming capability; new air data computer and radar altimeter; new digital IFF instead of the Type 602 (Soviet 'Odds Rods' type); and more secure GEC Avionics AD 3400 VHF/UHF communications radio.[25] Marketing of the F-7 and F-7M is carried out by CATIC in China, and via agents in other countries such as SAI (Singapore) and Custom Associates (USA).

Foreign military procurement began relatively recently in Communist China and has led to the creation of new purchasing companies. Three essentially distinct channels have evolved as shown in Table 4. The political channel is

Table 4. Defense procurement channels in China [26]

Political channels (FMS)			
	National Defense		
Xinshidai			
State Council	Science & Technology & Industry Commission	Ministry of Defense	(New Era) Corp.
Military channels			
		General Logistics Dept	Xinxin Corp
People's Liberation Army (PLA)	Chief of General Staff	Equipment Department	Polytechnical Corp (Polytech)
Regular commercial channels			
	Ministry of Space	Great Wall	(missiles, rockets)
	Ministry of Space	CPMC	(small tactical missiles)
	Ministry of Ordnance	Norinco	(conventional weapons)
PLA requisition	Ministry of Aviation	CATIC	(aircraft)
	Ministry of Electronics	CNEIEC	(radar)
	Ministry of Foreign Trade	Everbright	(misc)

through the official organization Xinshidai, formed in 1980. It provides a corporate body for seven existing Chinese factory groups in the areas of nuclear technology, aviation, electronics, ordnance, space, machinery and shipbuilding. This corporation is physically located at the Ministry of Defense and carries on the government-to-government dialogue on matching Chinese interests with what foreign governments/suppliers wish to sell. In the US, the sale of weapon systems amounting to more than $14 million, or related equipment costing over $50 million, is subject

to congressional review. The Chinese embassy's three FMS-trained officials in Washington maintain a regular dialogue with the DOD on the submission and monitoring of procurement applications. [27]

The PLA's direct buying channel is through Polytech, which surfaced in 1984. Polytech president He Ping is Deng Xiao Ping's son-in-law, so this body's purchasing authority is clear. The actual amount of purchases made through Polytech will depend, however, on how much goes via the Xinxidai/FMS channel, and on whether key PLA buyers redirect their purchasing via Polytech or use "old friends" in other Chinese companies such as Everbright or Norinco.[28]

In addition, the regular commercial channel continue to be used for military purchases - CATIC for military avionics, Norinco for ordnance and CNEIEC for artillery radar, while Everbright is using its Hong Kong offices for a continuing dialogue on a number of military items.

The organization that allocates funds to these trading companies was formed in February 1983, as party leaders took another step to consolidate China's defense organizational structure, merging the National Defense Industries Committee (NDIC) and the National Defense Industries Office (NDIO) with the government's National Defense Science and Technology Commission (NDSTC). The new body known as the Commission on Science, Technology, and Industry for National Defense (NDSTIC), now acts as a clearinghouse

for assessing defense-related research and development in the PRC and serves as the coordinating center for the PLA weapons procurement, research, and testing. Reportedly, the impact of the NDSTIC has been somewhat diluted, however, since its personnel tend to have political rather than technical or professional backgrounds and tend to lean more toward the party than toward the state military commission for decision-making guidance.[29]

While the NDSTIC is vested with the overall authority for supervising the process of national defense industrialization, the cumbersome bureaucracies of relevant institutions, often working at cross-purposes, have largely stayed intact. For example, the Ministry of National Defense, which administratively answers to both the Central Military Commission (CMC) and NDSTIC, is charged with defense budgeting, but not with the implementation of actual programs designed to run the PLA. That function is left to the PLA's General Departments: The General Staff Department; the General Political Department; and the General Logistics Department, which oversees the increasingly important aspects of testing existing PLA equipment. Moreover, six different ministries of machine building now operate outside the formal PLA structure, although they are still largely staffed by PLA personnel: Nuclear Industry, Aeronautics, Ordnance, Electronics, Space, and Shipbuilding.

The net result of sustaining this variegated defense production hierarchy is that the ultimate responsibility for the success or failure of the defense industries has rested on the shoulders of the individual, largely autonomous factory manager who has been isolated from both the more glamorous R&D institutions sponsored by the NDSTIC and the Chinese Academy of Sciences, which still jealously guards its prerogative for supervising all pure research in the country.[30]

Ever since the 10-year program for China's Four Modernizations was publicly revealed in 1979, defense has vied with science and technology for third position in the country's overall modernization efforts (behind agriculture and industry). Interestingly, the majority of China's top military leaders seem to have accepted this low priority. For one thing, they apparently recognize that the PRC at present cannot afford to sustain the multibillion dollar expense needed to catapult China's weapons systems into strategic parity with the force inventories of the Soviet Union and the United States. For another, party leaders have been steadfast in their determination to match the superpowers' defense strength over the long term by creating the type of indigenous science/technology infrastructure that would enable the PRC to develop its own modern weapons inventories, even as newer ones are being developed, has remained the CCP's policy for the gradual acquisition of

S&T relevant for advanced weapons design programs. Current Minister of Defense Zhang Ai-ping has reiterated this theme, stressing that the "fundamental way" to "develop and produce sophisticated military equipment" is "to rely on ourselves." [31]

NOTES

1. C^3I refers to command, control, communications, and intelligence.
2. Richard Baum, ed., China's Four Modernizations: The New Technological Revolution (Boulder, 1980) p. 4.
3. Baum, p. 5.
4. Baum, p. 6.
5. Harlan W. Jencks, From Muskets to Missiles: Politics and Professionalism in the Chinese Army, 1945-1981 (Boulder, 1982), p. 212.
6. William T. Tow, "Science and Technology in China's Defense," Problems of Communism (July-August 1985), p. 20.
7. Angus M. Fraser, "Military Modernization in China," Problems of Communism (Sept-Dec 1979), p. 40.
8. Fraser, p. 40.
9. Christopher E. Stowell, "China's Defense Market Comes of Age: a view from the US of the US-China defense relationship," International Defense Review (Dec, 1985), p. 1919.
10. "China: Birth of an Arms Salesman," The Economist (Nove. 17, 1984), p. 40.
11. The Type 63 is a Chinese upgunned and enlarged version of the Soviet PT-76 amphibious light tank.
12. G. Jacobs, "China's tank armies," Jane's Defence Weekly (Feb. 1, 1986), p. 161.
13. Christopher F. Foss, "China and UK join forces in new MICV project," Jane's Defence Weekly (Jan. 11, 1986), p. 5.
14. Foss, p. 5.
15. Christopher F. Foss, "Chinese Type 69 II MBT - details revealed," Jane's Defence Weekly (Feb. 8, 1986), p. 207.
16. Foss, "Chinese Type 69," p. 207.
17. Jacobs, p. 161.
18. Terry J. Gander, "Norinco's Range of Towed Artillery," Jane's Defence Weekly (Dec 8, 1984), p. 1008.
19. Terry J. Gander, "Norinco offers three new rockets for export," Jane's Defence Weekly (Dec. 1, 1984), p. 966.
20. Terry J. Gander, "Light anti-aircraft guns from Norinco," Jane's Defence Weekly (Dec. 22, 1984), p. 1099.
21. Kenneth Munson, "Fishbed, Finback and the Chinese future," Jane's Defence Weekly (Dec. 21, 1985), p. 1368.
22. Munson, p. 1368.
23. Munson, p. 1367.
24. Stowell, p. 1922.
25. Munson, p. 1367.
26. Stowell, p. 1923.

27. Stowell, p. 1924.
28. Stowell, p. 1924.
29. Tow, p. 18.
30. Tow, p. 18.
31. Tow, p. 20.

CHAPTER FIVE

CONCLUSION

In attempts to increase their military strength during the last hundred years, Chinese leaders have been faced with a whole series of grave problems. These have included industrial backwardness, poverty, illiteracy, political decentralization, nepotism, a shortage of qualified officers and opposition to change. They have found an industrial foundation is essential to the maintenance of an effective army, while the size and equipment of the armed services ultimately depend on the ability of the economy to finance them.

The ordnance industry of the late nineteenth century was the epitome of the self-strengthening movement, the vanguard of its achievements, and the victim of its shortcomings. The environment of foreign dependency in which the industry developed forced the arsenals to rely on China's potential enemies for the elements necessary to maintain modernized production. Guided by realism, practicality, and open-mindedness on the part of its leaders, the ordnance industry not only opened the era of modernized ordnance production, but it also stimulated change in education, in economy, and, most important, in official attitudes.

To understand the nature of present Chinese concerns with military modernization, it is essential to recognize

that the issue is by no means a new one in the annals of the Chinese Communist Party (CCP). In keeping with the conceptual framework of "People's War", the Chinese Communists during the Civil War years did whatever they could to improve the supply of weapons at their disposal, but in practice their main source of weapons was defecting soldiers and units and equipment captured on the battlefield. This sort of acquisition enabled the Chinese Communists to keep forces operating in the field during the Civil War, but it meant that the leadership had little experience in the design of weapons and the logistics of their production when the CCP came to power in 1949. Furthermore, the Korean War, coming so soon after the Chinese Communists had displaced the Nationalists, denied Peking the luxury of going back to basic principles and building a modern army in keeping with a coherent, long-range defense posture if, of course, it had any desire to do such a thing in the first place. The overall force structure of the mid-1950s was one conditioned by the exigencies of the war and by China's dependence upon the Soviet Union as its sole source of military supplies.

Growth in China's military capability has been hampered in this last decade by a number of factors, including 'low priority' under the current regime's "Four Modernizations" program; leadership differences over the correct way to modernize the PLA; an absence of the required technical and scientific base (primarily personnel) upon

which to embark on a major upgrading effort; and serious difficulties within the PLA from the professional academy levels down to the infantryman hampering professionalism in the force. 'Military modernization' is only one aspect of China's larger security calculations. Its priorities center on economic modernization.

The PLA has certain institutional restraints that effect its ability to absorb various levels of foreign military equipment. Problems in the logistical areas including a lack of modern munitions storage facilities; a rudimentary spare parts support system for technically intricate parts that cannot be easily manufactured at the local level; a logistical system that is heavily dependent on the railroads for strategic support and severly lacking in mobility at the regional military levels are all present.[1]

The generally low priority assigned to military modernization shows leaderships' recognition that they must first correct fundamental weaknesses in the pattern and rate of economic development before military-sector modernization can occur smoothly.

The industrial infrastructure of China must be capable of supporting the upgrading of the military, and the two areas critical in the effort are the machine industry and the power-generating and power-machinery industry. According to Chinese thinking, the machine building industry is the key to overall modernization. The successful

transformation of this industry into a supporter of military modernization is one still encumbered by the technology base, generally fixed within the 1950s (the period of Sino-Soviet cooperation).[2]

Since the withdrawal of Soviet technicians in 1960, only minor improvements have been made. Much of this has been done by copying Western and Japanese machinery, with some upgrading of earlier Soviet products. The machine tool industry will remain the key, for around this revolves the success of future shipbuilding projects, motor vehicle industry, locomotive production, power-generating equipment, and the communications industry in general. [3]

Much of the defense industry has been given the 'green light' to export and loosen its dependence on internal defense orders. In the last five years, China has been quite successful in selling inexpensively-priced equipment to the Third World. Despite this success, there remain problems associated with basic research and maintenance of finished products.

But China is also in the market for mid-1970s technology and manufacturing equipment to produce and upgrade military equipment for export. China is the seventh-largest exporter of military equipment in the world, with foreign exchange earnings estimated in excess of $1 billion in 1985. China has already purchased a wide range of products and technology, including tank fire control

systems, image range finders and radars for incorporation into Chinese-made military systems sold to Pakistan, South America, Thailand, Bangladesh, Sri Lanka, and the Middle East. [4]

The most critical remain in the design of technology and in adapting new technology. While China is conducting research into a number of air, ground, missile, and naval areas, the technical base remains about two decades behind actually fielded Soviet systems. [5]

Predicting the changes in China's military capability for the late 1980s is a difficult proposition, and would make assumptions as to leadership stability and continuity of policies of the existing regime.

As China is embarking on its seventh Five Year Plan shortly (1986-1990), only the past can be considered as a guide to future expenditures and production levels, which will ultimately determine China's military force levels.

NOTES

1. G. Jacobs, "USA-China military co-operation - what lies ahead," Jane's Defence Weekly (Mar. 22, 1986), p. 527.
2. Jacobs, p. 527.
3. Jacobs, p. 527.
4. Roger W. Sullivan, "US Military Sales to China," The China Business Review (Mar-Apr 1986), p. 8.
5. Jacobs, p. 527.

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TO: DGDP FROM Dir, DJCO DATE 25 Oct 88 CMT 2
MSG Flannigan/ac/3980

Recommend subject thesis be released under "Distribution Statement A".

for RICHARD H. TAYLOR
Colonel, Infantry
Director, DJCO

CF:
CARL
ATTN: Documents Service